

Prescription Drug Monitoring Programs

Evidence-based practices to optimize prescriber use

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The Pew Charitable Trusts is driven by the power of knowledge to solve today's most challenging problems. Pew applies a rigorous, analytical approach to improve public policy, inform the public, and invigorate civic life.

Overview

The prescription opioid epidemic poses major threats to the nation's health. According to the Centers for Disease Control and Prevention, approximately 19,000 people in the United States died from overdoses involving prescription opioids in 2014—a 16 percent increase from the previous year, and the highest number ever recorded.¹ Emergency room visits by people using opioids for nonmedical reasons, such as taking a higher-than-prescribed dose or a prescription intended for another person, increased 117 percent between 2005 and 2011.² Furthermore, people who are addicted to prescription opioids are 40 times more likely to become addicted to heroin.³ And the rate of deaths involving heroin increased nearly fivefold between 1999 and 2014,⁴ with more than 10,500 people dying of heroin-related overdoses in 2014.

Because increased prescribing of opioids has been a primary driver of the prescription opioid epidemic, reducing the overprescribing of these therapies is a primary focus of efforts to reverse these trends.⁵

Prescription drug monitoring programs (PDMPs) are state-based electronic databases that contain information on controlled substance prescriptions dispensed by pharmacies and prescribers. These programs can help reduce the misuse and “diversion”—the redirection of drugs from legal, medically authorized uses to illegal uses—of controlled substances, including prescription opioids.

PDMPs allow prescribers and pharmacists, as well as other individuals and entities (such as researchers, health insurers, and medical licensing boards) that are authorized to access the data, to monitor controlled substance use by patients, the prescribing practices of medical practitioners, and population-level drug use trends. For example, a prescriber who is considering issuing a controlled substance prescription can check a patient's exposure to commonly misused drugs, such as opioid pain relievers and benzodiazepine anti-anxiety medications; licensing boards can use the data to identify aberrant prescribing patterns by practitioners; and state public health officials can use aggregated PDMP data to inform the development and implementation of targeted public health interventions, such as prescriber education campaigns. However, the type of access that is authorized varies by user. For instance, while prescribers have access to PDMPs and use them to examine controlled substance prescriptions on the individual patient level, state public health officials can access PDMP data only at the aggregate level. (Additional information on these and other PDMP uses is available in the Background section of this report.)

According to the Prescription Drug Monitoring Program Training and Technical Assistance Center—a partnership of the Bureau of Justice Assistance and the Heller School for Social Policy and Management at Brandeis University that helps stakeholders plan, implement, standardize, and enhance PDMPs—the number of PDMPs has grown rapidly in the past 15 years, with programs now operational in all states (with the exception of Missouri), Guam, and the District of Columbia.⁶ However, the number of prescribers utilizing PDMPs remains low, thus limiting the effectiveness of these databases.

The White House Office of National Drug Control Policy, which has said that PDMPs are critical to improving public health,⁷ has set a goal of doubling the number of health practitioners registered with PDMPs by 2017.⁸ Consequently, PDMP administrators, state and federal health officials, professional organizations, and legislators are examining ways to increase prescriber use of PDMPs.

This report, written by researchers from the Institute for Behavioral Health, Heller School for Social Policy and Management at Brandeis University in collaboration with The Pew Charitable Trusts, describes eight evidence-based practices aimed at increasing prescriber utilization of PDMPs:



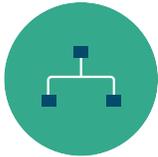
Prescriber use mandates

Requiring a prescriber to view a patient's PDMP data under certain circumstances, such as before writing an initial prescription for a controlled substance.



Delegation

Allowing prescribers to designate someone on staff, such as a nurse, to access the PDMP on their behalf to help manage workflow.



Unsolicited reports

Proactively sending communications from PDMP staff to prescribers, dispensers, law enforcement, and regulators to flag potentially harmful drug use or prescribing activity based on PDMP data.



Data timeliness

Uploading information into the database at set intervals, whether in real time, daily, weekly, or monthly. (Dispensers, which include pharmacies and prescribers who provide medications directly to patients, are responsible for uploading data.)



Streamlined enrollment

Simplifying processes, such as instituting automatic PDMP registration triggered by state controlled substance registration, to more easily enable prescribers to enroll in a PDMP.



Educational and promotional initiatives

Making efforts to promote the program, including prescriber training (via formats that include online videos and instructional materials) on how to access and use PDMP data.



Health information technology (IT) integration

Combining PDMP data with other clinical data through technologies that are used to store, communicate, and analyze health information, such as electronic health records.



Enhanced user interfaces

Implementing user-friendly technologies, such as dashboards and mobile applications that provide PDMP data in easily understandable formats.

The extent and quality of evidence of these practices' effectiveness varies, but there is sufficient information to conclude that adopting one or more of them will increase prescriber utilization of PDMPs. The review of available evidence found that the practices can work in the following ways:

- **Prescriber use mandates** can rapidly increase PDMP utilization, which can have an immediate impact on prescriber behavior, helping to reduce inappropriate prescribing of opioids and benzodiazepines and also multiple-provider episodes (when patients visit numerous prescribers and/or pharmacies to obtain the same or similar drugs in a short time span). Kentucky, New York, and Ohio are potential models for states looking to mandate PDMP use.
- **Delegate accounts, daily dispenser reporting** (a common approach to improving data timeliness), and **streamlined enrollment** are practical solutions already adopted by nearly half of states and are feasible to implement based on state experience. Kentucky, Maine, and Oregon can offer lessons to states interested in delegate accounts, while Kentucky and Oklahoma can serve as examples for states interested in improving data timeliness. Experiences in Massachusetts, Minnesota, and Tennessee can also inform states hoping to streamline enrollment.
- **Unsolicited reporting** and **educational and promotional initiatives** are effective mechanisms to encourage enrolled prescribers to use the database and also to inform unenrolled prescribers about the value of PDMPs, especially in states that lack a prescriber use mandate. States looking to send unsolicited reports can learn from experiences in Indiana, Maine, and Massachusetts; similarly, states looking to bolster educational and promotional initiatives can take cues from Florida, Maine, and New York.
- **Health IT integration** and **enhanced user interfaces** can be effective in helping address barriers to using PDMPs, as demonstrated by pilot studies and state-based projects, but strategies for implementing these practices on a wide scale require further study. Indiana and Washington are potential models for states that wish to pursue health IT integration; states aiming to enhance user interfaces can look to California, Indiana, and New Jersey for guidance.

This report also includes case studies of states that have implemented one or more of these practices.

Background

PDMPs are essential tools for addressing the prescription opioid epidemic.⁹ These programs provide secure online access to a database of dispensed controlled substance prescriptions for a variety of authorized users, and

they serve as a key resource for individuals and agencies responsible for addressing this public health problem. While most states engage in one or more evidence-based PDMP practices to help increase prescriber utilization, these strategies remain far from universal. Greater adoption of these practices can significantly help in this effort and is, therefore, the objective of this report. This paper continues work begun with a 2012 report jointly issued by Pew and Brandeis University that reviewed the evidence for 35 practices across all phases of PDMP operations.¹⁰ States that have implemented these practices have done so to varying degrees, and using different approaches. For example, delegate accounts and unsolicited reports are used by the majority of states, but their implementation varies (see pages 18 and 23). In contrast, integration of PDMP data into health information exchanges and electronic health records is a promising, but not yet widely adopted, approach, as is the creation of enhanced interfaces to provide user-friendly prescription data summaries. Thus, considerable opportunity exists to further increase prescriber use of PDMPs. To address the prescription opioid epidemic and the growing use of heroin that stems in part from prescription opioid misuse,¹¹ it is vital for prescribers to optimize their use of prescription drug monitoring data, which describe a patient’s controlled substance prescription history. Controlled substances are divided into schedules, ranging from Schedule I (i.e., substances with no accepted medical use) to Schedule V (i.e., substances that have low potential for abuse).

Table 1
Controlled Substance Schedules Definitions and Examples

Controlled substance schedules	Definitions	Examples
Schedule I	No currently accepted medical use in the United States, a lack of accepted safety for use under medical supervision, and a high potential for abuse	Heroin, lysergic acid diethylamide (LSD), marijuana (cannabis)
Schedule II	High potential for abuse, which may lead to severe psychological or physical dependence	Hydromorphone (Dilaudid), methadone (Dolophine), oxycodone (OxyContin, Percocet), fentanyl
Schedule III	Potential for abuse less than substances in Schedules I or II, and abuse may lead to moderate or low physical dependence or high psychological dependence	Products containing not more than 90 milligrams of codeine per dosage unit (Tylenol with codeine), and buprenorphine (Suboxone)
Schedule IV	Low potential for abuse relative to substances in Schedule III	Alprazolam (Xanax), carisoprodol (Soma), clonazepam (Klonopin), clorazepate (Tranxene)
Schedule V	Low potential for abuse relative to substances listed in Schedule IV and consist primarily of preparations containing limited quantities of certain narcotics	Cough preparations containing not more than 200 milligrams of codeine per 100 milliliters or per 100 grams (Robitussin AC, Phenergan with codeine), ezogabine

Source: Drug Enforcement Administration, “Controlled Substance Schedules,” accessed Aug. 12, 2016, <http://www.deadiversion.usdoj.gov/schedules>

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By viewing a patient’s record of prescriptions for controlled substances as displayed by a PDMP, a prescriber can better judge whether the patient might be visiting other clinicians for the same or similar drugs, a practice known as multiple provider episodes.

A patient’s controlled substance prescription history functions as an element of his or her health record, thus contributing to better-informed clinical decision-making and patient care by practitioners. A suspicious PDMP

report can trigger consultations with other providers about the patient's care, conversations with the patient on possible problems with pain management, or screenings or referrals to substance use disorder treatment or a pain specialist, as appropriate.¹² Upon discovery of multiple provider episodes or a substance use disorder, a practitioner will sometimes dismiss a patient from his or her practice, but the practitioner should refer the patient to other practitioners or coordinate care with them.¹³

Survey data and research studies indicate that prescribers find PDMP data valuable to their practices, increasing their knowledge of the patient's situation and their confidence in their own prescribing choices.¹⁴ A growing number of states require prescribers to enroll in the PDMP, and some mandate accessing PDMP data before the initial prescribing of controlled substances, as well as at defined intervals after that, should prescribing continue.¹⁵ Some health care employers (e.g., hospitals, chain pharmacies) require employees to have and use PDMP accounts as a condition of employment.¹⁶

While this report focuses on prescriber utilization, PDMPs are also used by the following:

Dispensers: Pharmacists and dispensing physicians are key potential users of PDMP information. Twenty PDMPs require dispensers to register with the PDMP,¹⁷ and 11 states went a step further, requiring them to query the PDMP.¹⁸ Additional research is necessary to develop evidence-based practices for pharmacist use of PDMPs.

Criminal justice systems: Prescription monitoring originated in California in 1939 as a law enforcement tool for drug diversion investigations. Twenty PDMPs allow law enforcement to query the database pursuant to active investigations, while 30 require a court order, subpoena, search warrant, or grand jury order.¹⁹ Some PDMPs analyze their data to identify likely instances of aberrant prescribing or pill mills (for-profit, high-volume clinics that prescribe large quantities of opioids for nonmedical reasons), which are then referred to criminal justice agencies for investigation.²⁰ Drug courts use PDMP data to monitor an offender's compliance with controlled substance restrictions implemented as part of a recovery program.²¹

Insurers: For third-party payers, PDMP data provide a complete picture of which controlled substances their enrollees may have access to, including prescriptions paid for in cash, and those covered by other insurers.²² Twenty-five states share PDMP data with Medicaid fraud and abuse teams and/or drug utilization and review teams, five with Medicare, seven with workers' compensation agencies, and two with private payers.²³

Researchers: To track prescribing trends and risks related to controlled substance use, researchers and epidemiologists analyze de-identified, or anonymous, PDMP data at the community, county, and state levels. For example, the Prescription Behavior Surveillance System (PBSS) is a public health surveillance project at Brandeis University funded by the Centers for Disease Control and Prevention (CDC) and Food and Drug Administration (FDA) and administered by the U.S. Department of Justice's Bureau of Justice Assistance (BJA). States provide de-identified PDMP data quarterly to the PBSS project so it can be examined over time.²⁴ Such analyses can provide early indicators of health problems related to prescription drugs, such as Indiana's 2015 outbreak of HIV infection driven primarily by injected prescription opioids.²⁵ These analyses can also help target interventions that community coalitions undertake in their drug misuse prevention efforts.²⁶

Other end users: Medical licensing boards, assisted by PDMPs, use prescribing data to help identify potentially risky or illicit prescribing behaviors, and such data can help confirm, or refute, allegations of intentional or inadvertent malpractice.²⁷ Medical examiners and coroners also find PDMP data helpful in determining cause of death by knowing what drugs the decedent may have had access to, and tracing the source of a controlled substance involved in a case.²⁸

The value of PDMPs

A growing body of evidence suggests that PDMPs are effective tools.²⁹ Although an analysis of mortality data from 1999 to 2008 found that PDMPs had a minimal effect on prescription overdose deaths,³⁰ more recent evidence from Florida and Kentucky suggests that using PDMPs may help reduce such deaths.³¹

Consulting PDMP data has been shown to influence prescriber behavior, and in surveys prescribers often report finding controlled substance history reports useful both in clinical practice and for detecting potentially inappropriate use, such as multiple provider episodes.³² This suggests that increased utilization of PDMPs would help to improve prescribing and patient care while reducing the negative health outcomes associated with the medically unnecessary use of controlled substances. It is therefore important to identify barriers to, and facilitators of, prescriber use of PDMPs.³³ Barriers to use include time-consuming processes for accessing PDMP data, cumbersome PDMP enrollment procedures, and data that are not timely or presented clearly.

Nationwide Survey Analyzes PDMP Awareness and Barriers to Use Among Physicians

A 2014 national survey of primary care physicians by researchers at the Johns Hopkins Bloomberg School of Public Health found that about three-quarters (72 percent) of the 420 respondents were aware of their state's prescription drug monitoring program. Six percent said their state does not have a PDMP, and the remaining 22 percent did not know whether their state had one. Among all physicians, only 53 percent reported using the PDMP. In clinical practice, physicians reported prescribing opioids to 35 patients per month, with PDMP users accessing data for eight patients in the month before completing the survey.³⁴ This research suggests that prescriber enrollment in a PDMP does not alone necessarily result in consistent use of the database. The research also identified barriers to use, including the time it takes to retrieve PDMP data and the complicated format of that information.

Prescriber enrollment and use of the databases varies widely among states. (See Appendix A.) Among 33 states providing 2014 enrollment data, the median rate among prescribers registered with the Drug Enforcement Administration (DEA) was 31.7 percent (it is a federal requirement that anyone issuing controlled substance prescriptions be registered with the DEA). Roughly three-quarters of these states reported prescriber enrollment rates that were less than 50 percent.³⁵ Prescriber and/or delegate queries (a rough measure of prescriber PDMP utilization) averaged 40.7 queries per DEA-registered prescriber, ranging from 2.5 in Nebraska to 224 in Kentucky.³⁶

Data provided by 18 states participating in the Harold Rogers Prescription Drug Monitoring Program grant program (which supports states in implementing or enhancing PDMPs) suggest that PDMP registration and utilization rates are influenced by how long the database has been available online and whether other strategies to increase registration and utilization (for example, mandated registration) have been implemented.³⁷ In the first half of 2012, states with online access prior to 2007 had higher average registration rates (58 percent) than states that gained online access between 2009 and 2011 (12 percent).

Evaluating Evidence-Based PDMP Practices

A PDMP practice, for the purposes of this paper, is a database operation, or a particular policy that PDMP staff might adopt when carrying out its functions. A best or promising practice is one that evidence suggests is an effective mode of operation, or an effective policy, that would contribute to optimizing use of a PDMP.³⁸ As evidence and experience accumulate, consensus will emerge on which practices should be prioritized for adoption.

Included in this report is a planning tool intended to help states in prioritizing PDMP enhancements, assessing their feasibility in light of available resources, designing and planning an enhancement, and developing budgets and funding requests. (See Appendix B.)

Methodology

In preparing this report, the authors examined the peer-reviewed literature on PDMPs as well as gray literature (e.g., reports, briefings, case studies, surveys, presentations, news articles). This document draws on the cumulative experience, observations, and expert opinions of knowledgeable stakeholders, especially PDMP administrators and staff with direct involvement in implementing practices. Case studies from selected states are included where implementation of a practice had a demonstrable impact in facilitating prescriber enrollment and/or utilization, or exemplified features likely to have such impact. Feedback from the selected states' PDMP staff was incorporated when drafting these case studies. Lastly, the authors fielded a survey on the adoption status of the eight practices to state and territorial programs and asked them to provide information on PDMP enrollment and utilization by prescribers. Forty-eight of 50 operational PDMPs responded to the survey.

Appendix C details the research methodology, including the literature review, case study state selection process, and survey.

Limitations

There were few, if any, studies providing measures of the direct effects of the adoption of individual PDMP practices on prescriber utilization. Implementation or enhancement of a PDMP practice is often accompanied by changes to other PDMP practices. Thus, it is particularly challenging to isolate the effects of changes with regard to a single PDMP practice. In addition, the methodology used for process measures, such as changes in prescriber registration with or utilization of the PDMP, was not consistent among states, nor was it necessarily consistent within a single state across studies or reports. Moreover, PDMPs are continually changing via laws, policies, and technology, making it difficult to correlate utilization rate changes to specific practices.

Similarly, few, if any, studies provided measures of the direct effects of PDMP practice implementation on outcomes measures or patient risks. Because changes to the PDMP were nearly always accompanied by other initiatives to address prescription drug misuse in the state, in most cases it was not possible to establish conclusive causal relationships about the impact of a particular practice.

There are few experimental, case-control studies on the effects of particular practices, so the evidence of effectiveness presented here is largely correlational, derived from observations of practice adoption and subsequent changes in process measures and patient outcomes. Tests of the statistical significance of the findings reported here are not possible, except when conducted as part of analytical studies. All opinions on the possible effectiveness of PDMP practices for increasing prescriber utilization are those of the report's authors, unless otherwise attributed.

The eight practices reported on here are not exhaustive of those that might increase prescriber use of PDMPs. The examples here of practice implementation in case studies may not reflect additional effective approaches not identified by the research conducted for this paper. While the authors describe some synergistic effects of adopting one or more of these practices in tandem, other effects no doubt exist. Nevertheless, the practices, case studies, and synergies described in this report may assist states considering options for increasing prescriber utilization of their PDMPs.

PDMP Practices That Support Increased Prescriber Utilization



Prescriber use mandates

Prescriber use mandates are state laws and regulations that require prescribers to view a patient's PDMP data under certain circumstances; these requirements vary by state.³⁹ The first mandates relied on subjective prescriber judgments, such as requirements that applied only if the prescriber believed the patient might be obtaining drugs from multiple prescribers. States found these requirements to be ineffective, and some states have been replacing them with mandates that apply to all initial controlled substance prescriptions and some subsequent ones.

In 2009, Nevada was the first state to enact a law mandating that prescribers obtain a patient's PDMP report before writing a prescription for a Schedule II, III, or IV controlled substance in the following circumstances: if the patient was new or the prescriber had not issued a controlled substance prescription to the patient in the previous 12 months—and if the prescriber believed the patient may have been seeking the controlled substance for a nonmedical reason. If these conditions were met, the prescriber was required to review the report to assess whether the controlled substance prescription was medically necessary.⁴⁰

Other states subsequently created similar mandates, usually requiring that prescribers check the PDMP only if they had doubts about a patient's motives in seeking medication. An exception was Oklahoma, which adopted a mandate requiring prescribers to check the PDMP when prescribing methadone.⁴¹

In 2012, Kentucky passed legislation implementing a comprehensive mandate. (See Kentucky mandate case study, Page 12.)⁴² Distinct from previous mandates, comprehensive mandates apply to all prescribers and at least to all initial opioid prescriptions issued to patients. States generally provide certain exceptions to the PDMP access requirement, such as for short-term prescriptions (e.g., 72 hours or less); for patients who are terminally ill and in the care of a hospice program; and if the PDMP is inoperable for a period of time. (See Appendix D.)

Other states have followed Kentucky's lead. Nevada changed its law in 2015 to replace subjective judgment with the requirement that all prescribers review PDMP data prior to issuing an initial prescription to a patient for a Schedule II, III, or IV drug when the supply is for more than seven days. Similarly, Oklahoma updated a law in 2015 mandating that prescribers use PDMP data prior to their first issuance of a prescription for an opioid, benzodiazepine, or the muscle relaxant carisoprodol, and at least every 180 days after that. Other states have followed this trend, with seven states enacting legislation that requires comprehensive use mandates scheduled

to go into effect in 2015, including the updated Oklahoma and Nevada laws. Figure 1 details which states have this type of prescriber use mandate.

Evidence of effectiveness

While comprehensive use mandates for prescribers had been in effect for only four years at the time of publication, there is evidence that they increase PDMP use and influence prescriber decisions. A University of Kentucky study found that the mandates reduced multiple provider episodes by more than half and produced a greater than fivefold increase in prescriber utilization of the PDMP. It also noted reduced prescribing of oxycodone (by 12 percent) and hydrocodone (by 13 percent).⁴³

In Tennessee, after the implementation of a comprehensive mandate and delivery of letters to the top 50 prescribers of controlled substances, opioid prescriptions decreased by about 7 percent, from some 9.5 million in 2013 to around 8.8 million in 2014. Opioids dispensing in Tennessee decreased by 5 percent (measured in morphine milligram equivalents, or MME, a standardized measure of opioid potency), falling from 9.8 billion to 9.35 billion MME during the same period, despite an increase in the state's population. The number of patients filling five or more prescriptions from different prescribers at five or more dispensers within 90 days decreased approximately 31 percent, from around 8,750 to 6,000. Prescriber, dispenser, and delegate searches of Tennessee's PDMP, meanwhile, increased roughly 405 percent, from about 1.8 million to 9.1 million.⁴⁴

After the implementation of use mandates, prescriber PDMP registrations increased in all three case study states (Kentucky, New York, and Ohio), as did requests for the controlled substance prescription histories of patients. For example, in New York, PDMP report requests increased from an average of 11,000 per month to 1.2 million per month in the six months after the mandate went into effect.⁴⁵

Additional details on these evaluations and their findings are detailed in the three case studies that follow (see Page 12). Of note, the implementation of a prescriber use mandate is correlated with the outcomes described in the three case studies, though it is not necessarily the sole cause of the outcomes.

Perspectives on implementation

Early comprehensive mandate states—Kentucky, Tennessee, and New York—have experienced rapid increases in PDMP registration as well as greater utilization of PDMP data. As a result, PDMP administrators have reported the need for additional staff, IT resources, and funds for increased training programs for prescribers and their delegates. In some cases, automated enrollment systems were implemented to replace paper-based application procedures to accommodate rapid increases in the demand for PDMP registrations.

State efforts to establish a more comprehensive mandate have been met by some level of opposition from prescriber communities—the most frequently reported barrier to implementation of such mandates. Some states have mounted successful campaigns to persuade medical professionals that requiring use of the PDMP is in the best interests of both patients and prescribers. With or without prescriber support, state legislatures have continued to pass mandate legislation at an accelerated pace in the years since comprehensive use mandates emerged. In response to concerns among medical groups, some state legislatures have adjusted their initial mandate requirements with updated laws to allow additional exceptions for required checking. For example, each of the 13 states with comprehensive mandates allows delegates to obtain reports, thus easing the burden on prescribers' time.⁴⁶ Seven of the 13 states established an exception when prescribing medications for seven days or less.

Current status of adoption

As of 2015, 27 operational PDMPs report having a use mandate of some type: 18 of the 27 require that prescribers utilize PDMP data under specific circumstances, and nine require queries before issuing opioid and benzodiazepine prescriptions.⁴⁷ Twelve states have followed Kentucky's lead and adopted comprehensive mandates that obligate all prescribers to request PDMP data with just a few exceptions.⁴⁸ Appendix D contains a table of information regarding the mandates in these 13 states.

Connecticut, Nevada, New Mexico, New York, and Pennsylvania have comprehensive mandates, in the model of Kentucky's legislation, that cover all drugs in Schedules II, III, and IV. In addition, New York applied its mandate to the issuance of every Schedule II, III, and IV prescription, not just at 90-day intervals (it does not apply to refills).⁴⁹ Pennsylvania's mandate also covers Schedule V.

CDC Defines Universal PDMP Use Requirements

In February 2016, the Centers for Disease Control and Prevention (CDC) released Prevention Status Reports (PSRs) for all 50 states and the District of Columbia. These reports use a three-level rating scale (green, yellow, or red) to show the extent to which a state has implemented a policy or practice in accordance with supporting evidence and/or expert recommendations. CDC said universal PDMP use requirements are supported by emerging evidence, expert consensus, and review of the primary drivers of the prescription drug overdose epidemic. The agency defined "universal use" as a requirement that prescribers consult the PDMP before initially prescribing opioids and benzodiazepines and at least every three months after that.

Four states (Connecticut, Kentucky, New York, and Ohio) received green ratings for having universal use requirements. Four states (New Jersey, Oklahoma, Rhode Island, and Tennessee) received yellow ratings for requiring prescribers to consult the PDMP before initial opioid prescriptions and again within one year. All other states and D.C. received red ratings for the following reasons: prescribers are not required to check the PDMP before initial opioid prescriptions; or prescribers must consult the PDMP but are not required to conduct subsequent checks, and/or requirements in those jurisdictions include subjective standards or broad exceptions. These ratings were assessed as of Oct. 31, 2015.⁵⁰

Case studies on prescriber use mandates

Kentucky enacts the first comprehensive prescriber use mandate

In April 2012, Kentucky passed H.B. 1, which called for the implementation of a comprehensive use mandate that required prescribers to query the PDMP prior to issuing a patient's first Schedule II or hydrocodone prescription (at the time hydrocodone was a DEA Schedule II drug), and at least every three months after that, with some exceptions.⁵¹ While prescriber use mandates had existed previously, Kentucky became the first state to require that all prescribers check the PDMP under these circumstances. Subsequent regulations from the professional licensing boards (such as the Kentucky Board of Dentistry and Kentucky Board of Nursing) extended the mandate to include all Schedule II, III, and IV controlled substances and required prescribers to query the PDMP at least every three months for continued therapy with Schedule III and IV drugs used to treat pain.⁵² Schedule III and IV drugs prescribed for other conditions require an annual rechecking of the PDMP under Board of Medical Licensure regulations.⁵³ H.B. 1, which contained the mandate, also included a number of other provisions intended to curb opioid overuse, including caps on the amount of certain substances that can be dispensed, strengthened regulation of pain clinics, and continuing education requirements for prescribers of controlled substances. A 2015 evaluation of the effects of this new requirement found that PDMP use had increased, multiple provider episodes had decreased, and patient access to needed pain medications was not adversely affected.⁵⁴

Before and after passage of this law, medical professionals expressed concern to legislators and licensing boards about the PDMP's enrollment and use requirements. In 2013 legislators responded to these concerns by amending the original requirements to include additional and adjusted exceptions from the mandatory use requirement.⁵⁵ The initial 2012 law contained exceptions for prescriptions written in an emergency situation, prior to or during surgery, for a three-day supply of Schedule II drugs after oral surgery, and for patients in hospice care, or prescriptions issued by optometrists in accordance with state regulations.⁵⁶

Exemptions allowed by the updated law include prescriptions issued within 14 days of surgery, for end-of-life treatment, for single doses of a controlled substance to relieve anxiety or pain prior to a procedure or test, for cancer pain, and for patients in hospitals and long-term care facilities. The 2013 update also allowed hospitals and long-term care facilities to establish facility-based accounts to access the PDMP.⁵⁷

The original law provided only three months to adopt the new mandate. This abbreviated time frame necessitated the implementation of a paperless online registration process that drew information from prescriber and pharmacist licensee files provided by professional licensure boards, rather than requiring each applicant to file a paper application.⁵⁸ This approach allowed for automatic verification of the user's license number and DEA registration.⁵⁹ To address additional workload resulting from the mandate, staffing for the PDMP help desk was increased from one full-time staff member to four staffers, administration was increased from two full-time staff members to three, and four temporary staffers were employed to process registrations and answer emails and phone calls. To handle increased demand on IT systems, analysts and system developers were expanded from two full-time staff members to five, and system hardware and software upgrades were installed. Implementation costs were covered by the Office of Attorney General, using funds received in litigation settlements, as authorized in H.B. 1.⁶⁰

The PDMP staff also launched prescriber education programs to acquaint prescribers with the mandate, including a web-based training module on the use and benefits of PDMP data.⁶¹ Eighteen months after adopting

the mandate, few complaints had been received about the requirement to use the PDMP,⁶² and many physicians had advised state officials that they found the mandate to be beneficial.⁶³

Process and outcomes measures

A University of Kentucky study examined changes in PDMP utilization and controlled substance prescribing and surveyed user perceptions of the PDMP's effectiveness and potential unintended consequences of H.B. 1; it also evaluated changes in patient and prescriber behavior and patient outcomes.⁶⁴ After the implementation of H.B. 1, prescriber registration to the PDMP increased, the number of dispensed controlled substance prescriptions decreased for the first time since the database launched, and multiple provider episodes decreased. It is important to note that while some of these effects may be related to mandated use of the PDMP, H.B. 1 included other provisions, such as strict regulations for pain management clinics, that likely contributed to these outcomes.

Researchers assessed unintended consequences of the mandate by comparing dispensing rates for drugs commonly associated with misuse and diversion in Kentucky (e.g., oxycodone, hydrocodone, and oxymorphone) to dispensing rates for opioids more commonly used in the treatment of chronic cancer pain (e.g., morphine and fentanyl). There was a decrease in the mean number of prescriptions per patient for those medications associated with misuse and diversion, while prescriptions for medications associated with chronic cancer increased, which, the researchers suggest, argues against a blanket "chilling effect" on prescribing. Likewise, the prescribing of commonly misused benzodiazepines decreased, while clonazepam, which is commonly used in treatment of seizures, was less affected.⁶⁵

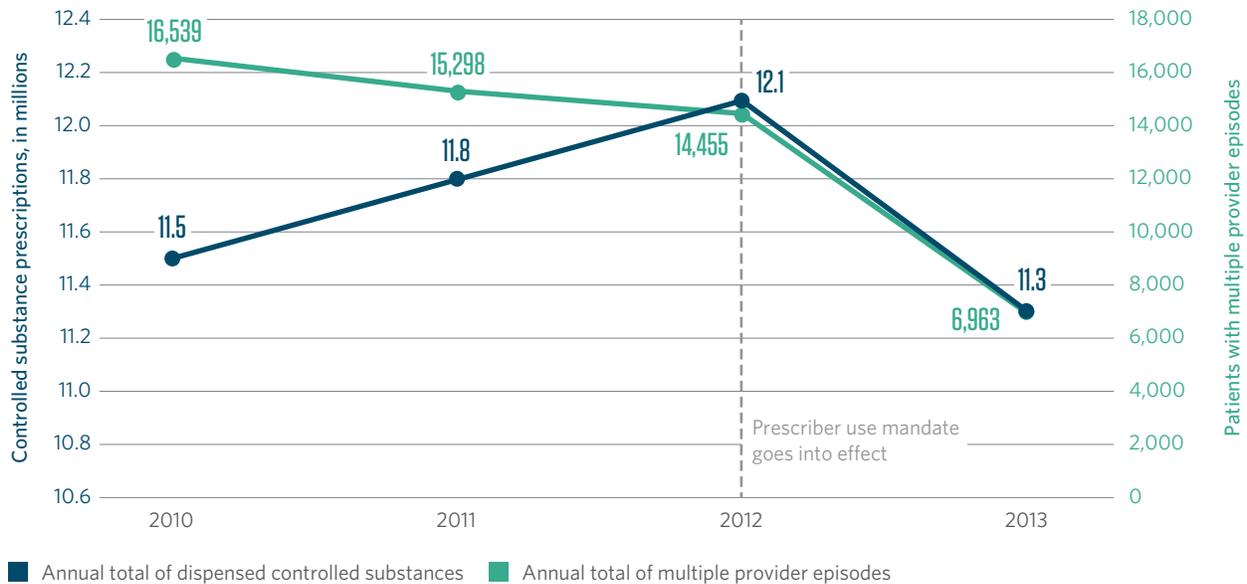
Regarding PDMP use and registration, prescriber enrollment increased by 262 percent, and pharmacist enrollment rose by 322 percent, from June 2012, the month before the mandate was implemented, to July 2013. The number of queries per prescriber also increased substantially. However, the baseline for this measure predates introduction of the mandate by three years and may, therefore, be attributed to factors beyond potential increased usage spurred by the mandate.

On average, there was a 6.4 percent reduction in the number of dispensed controlled substance prescriptions in Schedules II through V from fiscal year 2010 to fiscal 2013. The decreases ranged from more than 4 percent for Schedule II drugs to nearly 6 percent for Schedule III and Schedule V drugs and more than 7 percent for Schedule IV drugs. This contrasts with increases in dispensing that ranged from roughly 5 to 8 percent for Schedule II and III drugs that occurred during fiscal years 2010 and 2011. Patterns associated with inappropriate prescribing also decreased, including prescriptions for high-dose oxycodone. The number of patients receiving prescriptions for the dangerous combination of an opioid, benzodiazepine, and muscle relaxant decreased by 30 percent.⁶⁶

As part of the law's evaluation, University of Kentucky researchers interviewed stakeholder groups that represented clinicians, law enforcement, and Medicaid as well as staff from licensing boards for physicians, nurse practitioners, and dentists. Nearly all stakeholders said the law contained provisions to ensure that patients would continue to receive needed treatment. Some prescriber groups said the mandate reduced the beneficial impact of the reports because they became too routine. Others believed the mandate removed the perception by some patients that they were being targeted or stigmatized. Most stakeholder groups praised the law's provision allowing PDMP reports to be included in patient charts, which allows prescribers and delegates to obtain reports for scheduled patients prior to appointments. They also cited this, and the ability to allow delegates to obtain reports, as helping manage workflow changes resulting from the mandate. (See Kentucky delegation case study, Page 20.)

Figure 2

Controlled Substance Prescriptions and Multiple Provider Episodes in Kentucky, 2010-13



Note: The study defined multiple provider episodes as individuals receiving multiple controlled substance prescriptions from four or more prescribers and filled at four or more pharmacies within a three-month period.

Source: University of Kentucky Institute for Pharmaceutical Outcomes and Policy

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The evaluation also included a survey of 1,479 PDMP registrants (a 9.2 percent response rate) to gauge the database’s impact and perceived effectiveness. A majority of respondents, 60.8 percent, perceived that they had made no changes to their controlled substance prescribing practices, while 33.4 percent reported a decrease in their prescribing of controlled substances. Only 3.6 percent indicated they no longer prescribe controlled substances. Among prescribers reporting a decrease in controlled substance prescribing, 22 percent said the law created a burden; 17.2 percent reported that the mandate allowed them to more easily identify possible “doctor shoppers” (patients visiting other clinicians for the same or similar drugs); and 15.5 percent indicated that they had prescribed less because of their increased referral of patients to pain management specialists. More than 70 percent of prescribers reported that no patients were dismissed from their practices as a result of information obtained from the PDMP after implementation of the law. Importantly, 28.2 percent reported referring patients to substance use disorder treatment since the implementation of H.B. 1.

It is important to note that while the total number of prescribers issuing prescriptions dispensed by Kentucky pharmacies decreased, this decrease was among out-of-state prescribers only; the number of in-state Kentucky prescribers issuing prescriptions dispensed by Kentucky pharmacies actually increased after the mandate. This indicates that requirements to use PDMP data prior to issuing prescriptions did not deter Kentucky physicians from prescribing controlled substances.

The study also found some evidence indicating improvement in patient behaviors and clinical outcomes. There was a trend toward modest decreases in multiple provider episodes, defined by the state as individuals receiving

prescriptions from four or more prescribers dispensed at four or more pharmacies within three months' time. Such episodes had fallen by 12.6 percent in the two years before the mandate was implemented, but dropped by a further 50 percent in the year after implementation. Hospital discharges with a diagnostic code indicating drug overdoses and deaths attributable to prescription opioids also decreased after implementation of H.B. 1. As noted previously, the law contained a number of provisions in addition to the mandate intended to influence prescribing. While there was an increase in heroin-related hospital discharges and deaths, this trend had started a year before the law was implemented and cannot be interpreted as a direct result of the law's provisions, including the PDMP mandate.

New York works with stakeholders to build support for prescriber mandate

New York mandated prescriber use of the PDMP as part of the Internet System for Tracking Over-Prescribing (I-STOP) provisions of the broader Prescription Drug Reform Act of 2012. The mandate went into effect on Aug. 27, 2013. As in Kentucky, there was initially some opposition to the mandate among state-based associations representing prescribers. To address this opposition, the New York State Department of Health, which houses the PDMP, asked these organizations to assist with developing provisions for the mandate and educating members about the requirements. Exemptions from the mandate and a provision that allows delegates to obtain reports on behalf of prescribers helped to mitigate concerns, as described in interviews conducted by PDMP staff after implementation of the mandate. Health Department staff also made numerous presentations at state professional association meetings, stressing the importance of PDMP data in helping to ensure safe prescribing and improve health care.⁶⁷

The mandate requires prescribers to consult the PDMP prior to issuing any Schedule II, III, or IV prescription, with exceptions provided under the following circumstances: a prescription is for five or fewer days (including those written by emergency department prescribers and other prescribers when the registry cannot be accessed in a timely manner); the practitioner is administering a controlled substance; the prescription is for a hospice or hospitalized patient; a situation in which accessing the registry would prevent patient treatment in a timely manner; or if the registry is inoperable (e.g., an electrical or technology failure). Veterinarians and prescribers who have received a waiver due to technology limitations are also exempt from the requirements.⁶⁸

The law allowed one year to implement the mandate. This timeline was necessary because the mandate involved a major upgrade to the PDMP infrastructure to accommodate projected increases in prescriber registrations and report requests. To meet the demands of this change and expanded use, the PDMP added eight full-time staff members, including five programmers and a pharmacy consultant with IT expertise. Two Medicaid staff members were also transferred to work full time on PDMP activities. The project's IT development took 7.5 months and resulted in approximate costs of \$1 million for staff time and infrastructure upgrades. Health Department staff were also involved in presenting at educational sessions and sending notifications to inform prescribers of the upcoming changes in mass mailings, emails, licensure renewals, and shipments of controlled substance prescription pads.⁶⁹

Process and outcomes measures

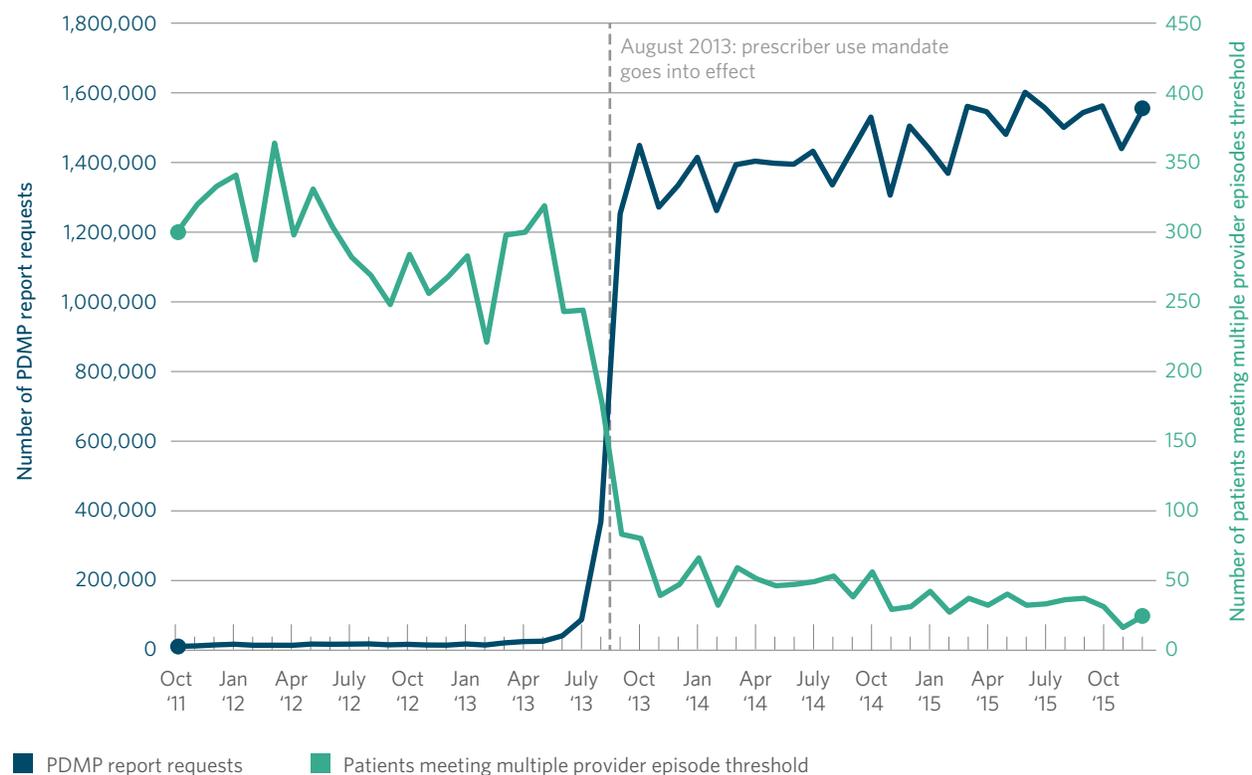
The state Department of Health tracked multiple indicators to assess the impact of the mandate and found that prescriber enrollment increased and multiple provider episodes decreased. Prescriptions for opioids also decreased, yet there was no indication that access to these drugs was adversely impacted for patients receiving these therapies for chronic cancer care.

The number of registered prescribers increased by 77 percent (from 50,857 to 90,121) between February 2013—six months before the mandate went into effect—and January 2014. The number of existing, but inactive, accounts decreased by almost 50 percent. Similarly, the number of registered pharmacists increased 680 percent (from 1,097 to 8,562) over the same period, even though the new law did not require dispensers to use the system. Educational programs were held throughout the state to support adoption of the prescriber use mandate, which likely contributed to the increase in registered prescribers and pharmacists.

The most significant change for prescribers and other users was the increase in requests for PDMP reports. During the 3½ years prior to the mandate, report requests averaged 11,000 per month. During the six months after the mandate began, users requested more than 7.3 million reports on over 3.5 million unique patients, which represents an average of roughly 1.2 million requests each month.⁷⁰

Prescribing and dispensing behaviors were also affected. The number of individuals involved in multiple provider episodes (in this case, patients obtaining controlled substance prescriptions from five or more prescribers and five or more pharmacies in one month) decreased 76.4 percent between the fourth quarter of 2012 and the fourth quarter of 2013, which was the first full quarter after the mandate.⁷¹ That trend continued and by the fourth

Figure 3
Multiple Provider Episodes and PDMP Requests in New York, October 2011 to October 2015



Note: Multiple provider episodes defined as patients using five or more prescribers and five or more dispensers within the month.

Source: New York PDMP

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quarter of 2015, the number of individuals involved in multiple prescriber episodes had decreased by 91.2 percent, compared with the fourth quarter of 2012.⁷² In addition to the mandate, the PDMP educational programs likely contributed to the trend.

Comparing opioid prescribing during the year before and after the mandate, the number of prescriptions dispensed for all opioids decreased by 8.7 percent, and the number of individuals receiving a prescription for an opioid decreased by 10.4 percent. Hydrocodone prescriptions decreased by approximately 18 percent.⁷³ In contrast, oxycodone prescriptions appeared little changed (slightly more prescriptions and patients, but a 3 percent overall decrease in doses dispensed). At the same time, there were increases in prescriptions for opioids commonly used in the treatment of chronic cancer pain, such as fentanyl and morphine (3.5 and 2.2 percent, respectively), which may signal that this type of patient care was not adversely affected.⁷⁴

Also, as in Kentucky, there was a marked increase (12.8 percent) in the number of patients who filled prescriptions for buprenorphine, a drug used to treat opioid dependence, during the fourth quarter of 2013 compared with the same time frame in 2012.⁷⁵ The number of buprenorphine prescribers also increased.⁷⁶ Collectively, these increases may signify a marked increase in persons being treated for substance use disorders, according to officials in both states.⁷⁷

Ohio adjusts prescriber use mandate with updated law

Ohio took a unique path to arrive at its current comprehensive prescriber use mandate. The state first implemented a requirement to check the PDMP based on whether the prescriber perceived that the patient would require long-term opioid therapy. Initially, this resulted in a reduction in the number of patients meeting the Prescription Behavior Surveillance System (PBSS) multiple provider episode threshold (five or more prescribers and five or more pharmacies within three months), but this trend started to reverse after a year, according to the PBSS data.⁷⁸ Subsequently, Ohio legislators enacted a comprehensive mandate, effective April 1, 2015.

The state's earlier law, passed in 2011, directed the licensing boards for health care professionals to develop regulations governing how prescribers and pharmacists should use the PDMP. In response, the boards required prescribers to review PDMP reports at the beginning of therapy and annually after that if they had reason to believe that treatment with controlled substances in Schedules II-V would extend beyond 12 weeks.⁷⁹

In 2014, state legislators enacted a new law mandating that prescribers must request a PDMP report prior to the first opioid or benzodiazepine prescription and every 90 days after that, with these exceptions: prescriptions for a medication supply of seven days or less; patients receiving treatment for cancer or another condition associated with cancer; hospice patients or those diagnosed as terminally ill; drugs administered in a hospital, nursing home, or residential care facility; and prescriptions for acute pain from surgery, other invasive procedures, or childbirth. There also is an exception if PDMP reports are unavailable.⁸⁰

The prescriber community opposed the 2011 and 2014 mandates during the legislative process. For the more comprehensive 2014 bill, the Board of Pharmacy, which administers the PDMP, worked with the bill sponsors to focus the mandate on opioid and benzodiazepine prescriptions, Ohio's most misused drugs. That focus, and an exception for prescribers writing a prescription for less than a seven-day supply, drew support from significant portions of the health care community.⁸¹

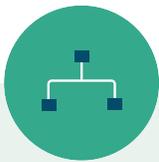
In Ohio, implementation of the comprehensive mandate occurred differently than in Kentucky or New York, because the transition from Ohio's 2011 mandate to the 2014 requirements happened more gradually, instead of on a single implementation date that marked a concentrated increase in use. This permitted the PDMP to make the necessary staffing and software adjustments over an extended period of time. State staff redesigned software to handle an increase in report production in 2011; computer hardware was already sufficient. For the expansion for the 2014 requirements, an online user registration system was installed. This necessitated replacing the notarized paper application, but security was maintained by substituting "knowledge based authentication," a proprietary process provided by LexisNexis that compares the information submitted by the applicant with public records and other information collected by the company.⁸²

This gradual approach worked successfully, but it required substantial flexibility in management to make frequent adjustments to meet the changing demands on the PDMP.

Process and outcomes measures

PDMP queries increased 505 percent after the 2011 implementation of the health care professional boards' rules to about 898,000 queries per month, on average, in 2014.⁸³

At the beginning of 2011, the rate of patients meeting multiple provider episodes was 22.5 residents per 100,000. After an initial decline to 12.7 in the first quarter of 2013, this trend began to reverse, reaching 17.3 by the third quarter of 2014. By June 2015, after enactment of the new mandate, the rate fell to 13.1.⁸⁴



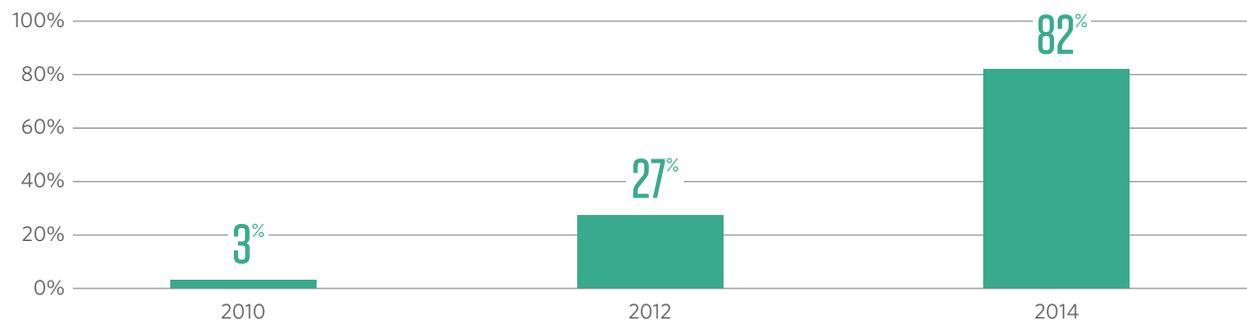
Delegation

A majority of PDMPs allow prescribers to authorize certain members of their health care teams to access the PDMP on their behalf. Such delegation is a widely adopted PDMP practice that supports, and potentially increases, prescriber use of the databases. Health care staff with delegate accounts, also referred to as "subaccounts," can save time for prescribers, thereby supporting PDMP use. Such process improvements can facilitate two important prescriber clinical practices: consistent use of PDMP reports for most or all patients prescribed controlled substances, and previsit planning to ensure that PDMP information is readily available to the prescriber during a patient's visit.⁸⁵

In general, prescribers must be registered with the state's PDMP before they can designate delegates. The prescriber may then authorize certain staff members to establish subaccounts. Some state PDMPs limit the number of subaccounts per prescriber, for example, up to two delegates are permitted in Alabama.⁸⁶ Other PDMPs, including the case study states below, impose no limits. Some restrict subaccounts to licensed, nonprescribing health care professionals such as nurses, while others permit unlicensed staff to be delegates. Restricting subaccounts to licensed professionals may offer an additional layer of accountability, but at the expense of potentially lowering PDMP utilization.

Figure 4

Percentage of States That Allow Delegate Access to PDMPs, 2010-14



Note: Data derived from state surveys administered by the Prescription Drug Monitoring Program Training and Technical Assistance Center measuring states that authorized the use of delegate accounts. There were 34 operational PDMPs in 2010, 44 in 2012 and 50 in 2014.

Source: Prescription Drug Monitoring Program Training and Technical Assistance Center

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Depending on the state, a delegate may conduct PDMP queries for multiple prescribers. In some states, a delegate working for multiple prescribers must have a separate subaccount for each prescriber. In other states, a delegate may have a single account and designate for which prescriber they are conducting a query. Unlike prescribers whose PDMP accounts can be deactivated by the state if the prescriber is no longer licensed, the prescriber is generally responsible for deactivating the PDMP account of a delegate who has left the practice or is otherwise no longer serving in this capacity.

Specific legislative and/or regulatory authority usually allows delegate access to PDMP data.⁸⁷ Barriers to authorizing delegate accounts include concerns about patient privacy and confidentiality.⁸⁸ Delegate misuse of PDMP information was reported to be low by staff from three state PDMPs interviewed for a study describing state approaches to delegation.⁸⁹ However, in the absence of formal reporting requirements, cases of such misuse, when they occur, might not come to the attention of state authorities. Penalties for misuse of data vary by state, including revocation of PDMP access, administrative fines, and misdemeanor or felony charges.⁹⁰

Some states hold prescribers accountable for their delegates' activity. To assist prescriber oversight of delegates, Oregon and Maine allow prescribers to audit multiple delegates with a single query. This allows the prescriber to monitor for unauthorized use of the data.

Evidence of effectiveness

Evidence suggests that adoption of delegate accounts increases PDMP use. Time constraints are what primary care physicians most frequently cite as a barrier to PDMP use. In one survey, 58 percent of physician respondents indicated that the information is too time-consuming to retrieve.⁹¹ Earlier research recognized that a lack of delegates could be a barrier to prescriber use of PDMPs while the ability to have delegates could serve as a facilitator of database use.⁹²

Data from the case study states suggest that delegates can generate significant numbers of PDMP report requests. In Kentucky, delegates account for most queries, and in Oregon they represent the main source of new registrations,⁹³ a key first step in increasing PDMP use. The case study states showed no clear correlation of subaccounts with reduced patient risk measures or improved outcomes, and uncovering such effects, if they

exist, would require further research. However, delegation often has been adopted in tandem with prescriber use mandates, and these practices together have shown improved patient outcomes such as reduced multiple provider episodes and opioid prescriptions. (See prescriber use mandates, Page 8.)

Perspectives on implementation

The administrative considerations for implementing subaccounts include the extent to which delegate registration and account management may be automated; state responsibility for identity proofing (verification of identity, such as with a driver's license); the extent to which adoption of subaccounts needs to be promoted; and auditing and enforcement responsibilities.

Beyond privacy concerns, prescriber resistance to the adoption of subaccounts may stem from the belief that monitoring subaccounts is burdensome.⁹⁴ However, in most practices, prescribers already delegate some aspect of patient record keeping and data collection to staff members. Monitoring delegate use of a PDMP may be integrated with the monitoring of other staff activities.

An incentive for prescriber adoption of subaccounts is the ability to avoid the alternative of sharing a prescriber's master or primary account password with staff, a practice that may compromise data security and is expressly prohibited by some PDMPs. Kentucky's initial allowance of subaccounts by administrative policy was intended to avoid password sharing.

Current status of adoption

State adoption of statutory and/or regulatory provisions allowing for delegates has increased rapidly in recent years. In 2010, just one operational PDMP (Utah) had provisions for delegates. In 2012, a dozen PDMPs allowed for delegates, and by 2014 the number had grown to 41.⁹⁵ In 2015, 40 operational PDMPs reported being engaged in this practice, meaning policies had been implemented and delegation was occurring.⁹⁶

Case studies on delegation

Kentucky becomes an early adopter of delegation

The Kentucky PDMP has, by agency policy, allowed delegate accounts since the program's web-based system became available in 2005, making it one of the earliest PDMPs to provide subaccounts. Delegation was formally codified in statute in 2012.⁹⁷

A major driver of the policy allowing delegation was a desire to discourage prescribers from sharing their passwords with staffers.⁹⁸ There is some administrative burden on the PDMP for subaccounts since registrants can enroll through a paper-based process as well as online. Moreover, PDMP staff have a role in verifying identity, for which Kentucky requires a driver's license. For cases in which the prescriber is using the online process to register a delegate and there is no verifiable driver's license, or a mismatch appears in the driver's license information, the prescriber is accountable for verifying the delegate's identity.

Kentucky's PDMP does not restrict subaccounts to licensed staff, but licensees have the option of providing their professional license number on the PDMP registration application. There are no limits on the number of delegates a prescriber may designate, and a delegate may conduct database queries on behalf of multiple prescribers. A delegate who works for multiple prescribers selects a prescriber from a drop-down list to record for which prescriber a report is being requested. The prescriber is responsible for deactivating accounts of delegates who

leave the practice, or otherwise warrant discontinuance of PDMP access. Prescribers can view and download a report of delegates' activity to monitor proper use of the PDMP.

Delegates are prohibited from conducting the clinical review of PDMP data that the mandate requires. Nonetheless, they may conduct database queries and provide PDMP reports for prescriber review. No implementation barriers were identified while researching this case study.

Process and outcomes measures

Kentucky's PDMP usage data suggest that delegates use the PDMP more frequently than prescribers. During the fourth quarter of 2015, delegates requested nearly 64 percent of in-state prescriber reports, despite accounting for 42 percent of combined delegate and prescriber master accounts by the end of that year.⁹⁹

There is evidence that prescribers are using delegates to meet legal requirements to check the database. As part of a broader evaluation of a 2012 Kentucky law that included a prescriber use mandate and a codification of the allowance for delegates, the University of Kentucky surveyed PDMP registrants to gauge the impact and perceived effectiveness of the database. Of the 1,479 prescribers who responded to the survey (a 9.2 percent response rate), more than 50 percent reported that delegates obtain the PDMP reports used in their practice.¹⁰⁰ The evaluation also included interviews of groups of physicians, nurse practitioners, and dentists. Some of those interviewed indicated that the most practical way to comply with mandated use was to retrieve reports for scheduled patients each morning and place this information in the patient's chart. The evaluation noted that the practitioners interviewed greatly appreciated the ability to delegate this task.

Oregon surveys highlight the need for delegation

Oregon launched its PDMP in 2011 with prescriber-only access but amended its statute to allow for delegate accounts effective January 2014 because statewide surveys showed they were needed.¹⁰¹ After that change, delegate accounts were the primary driver of new PDMP accounts in Oregon.¹⁰² A 2012 survey of licensed doctors, physician assistants, nurse practitioners, osteopaths, dentists, and pharmacists found that lack of time and lack of PDMP delegate access were barriers to PDMP use.¹⁰³ A 2013 prescriber survey found that roughly half of respondents—46.6 percent of frequent users (more than one query per month), 58.4 percent of infrequent users (one or fewer queries per month), and 45.1 percent of nonregistrants—cited inability to delegate PDMP access to medical staff as a barrier to PDMP use, and most (greater than 60 percent in each user category) cited time constraints as a barrier.¹⁰⁴

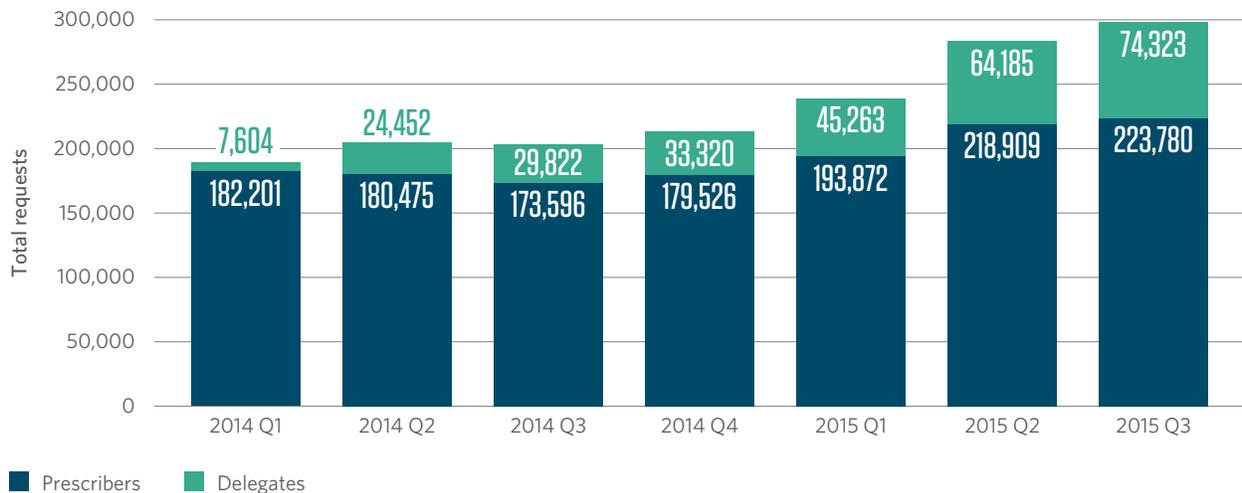
Oregon regulations require prescribers to conduct monthly audits of delegate use.¹⁰⁵ Accordingly, the Oregon PDMP provides a mechanism for prescribers to audit delegate use of the PDMP, including the ability to audit multiple delegates with a single query. To establish an audit trail, delegates use a drop-down list to select the prescriber on whose behalf the query is being made.¹⁰⁶ Prescribers use the same system to link and unlink delegate accounts to their primary account. Delegate accounts inactive for six months are automatically deactivated.¹⁰⁷ No implementation barriers were identified while researching this case study, but there is some administrative burden on the PDMP because delegate registration is a paper-based process.¹⁰⁸

Process and outcomes measures

In the first quarter of 2014, the first year delegation was allowed in Oregon, delegate use accounted for just 4 percent of all queries.¹⁰⁹ Delegates now account for one-quarter of PDMP queries in Oregon.¹¹⁰

Figure 5

Prescriber and Delegate Requests for PDMP Reports in Oregon, 2014-15



Note: Oregon implemented delegate accounts in January 2014.

Source: Oregon Health Authority

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One year after delegation became available, the Oregon Health Authority's annual PDMP report found that overall use of the PDMP by health care personnel increased by 30 percent. Queries conducted by medical doctors, doctors of osteopathy, and physician assistants decreased by 8 percent (279,920 queries in 2013 to 257,614 queries in 2014), while delegates queried the PDMP more than 95,000 times. The authors concluded that physicians were taking advantage of the ability to have delegates access the PDMP on their behalf.¹¹¹

Maine takes cues from other states, key stakeholders in documenting the need for delegation

The Maine PDMP became operational in 2004 and began registering delegates in 2011, prompted, at least in part, by interviews and surveys of 23 PDMP administrators, providers, law enforcement, organizations representing health care and substance abuse treatment providers, the Maine Office of Substance Abuse and Mental Health Services, and the state-local collaborative Healthy Maine Partnerships.¹¹²

Delegation initially placed some administrative burden on PDMP personnel because of the need to process paper-based registrations for subaccounts and verify identities. Subsequently, on Oct. 31, 2015, the state adopted an online registration process, with prescribers responsible for verifying their delegates.¹¹³

Process and outcomes measures

The number of PDMP subaccounts and the number of reports requested in Maine has kept pace with the increasing number of registered prescribers in recent years, maintaining a similar proportion of delegates to registered prescribers.¹¹⁴ Until recently, delegate queries were recorded under a prescriber's account, not the prescriber's subaccounts; therefore, delegate queries could not be distinguished from those of prescribers. This prevented analysis of delegate use of the PDMP and presented challenges for prescriber auditing. As a result of

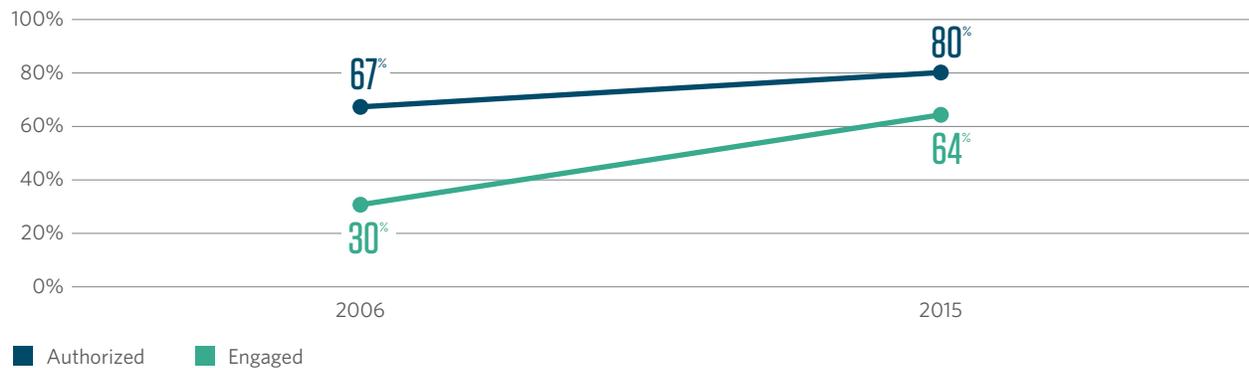
the online registration process, delegate and prescriber queries can now be distinguished from one another. Thus, prescribers can audit delegates, including multiple delegates in a single query.¹¹⁵



Unsolicited reports

Unsolicited reporting serves to notify prescribers, whether enrolled in the PDMP or not, about the possible high-risk status of a patient that otherwise might not come to their attention. Examples of risk criteria include multiple provider episodes, combinations of commonly misused drugs (e.g., opioids, benzodiazepines, and muscle relaxants), or exceeding a threshold for an average daily dose of an opioid in morphine milligram equivalents (e.g., more than 100 MME) that is considered a risk factor for opioid overdose and death.¹¹⁶ The PDMP is the sole source of the patient information highlighted by the unsolicited report, helping to inform appropriate prescribing, which could further drive enrollment and use. Reports can prompt prescribers to coordinate care with other providers prescribing controlled substances to their patients; screen patients for possible substance use disorders; and if necessary, adjust their prescribing or refer patients to appropriate treatment.¹¹⁷ Nearly two-thirds of PDMPs send reports or alerts to prescribers to flag patients with multiple provider episodes or other risks for overdose, duplicative therapy, or substance use disorder.¹¹⁸

Figure 6
PDMPs That Allow For and Send Unsolicited Reports, 2006 vs. 2015



Note: The 2006 data includes 30 PDMPs and was derived from a survey of 32 PDMPs: 19 fully operational, six under development, and seven authorized in statute but not yet functioning.

The 2015 data are derived from 50 PDMPs, including the District of Columbia, which had authorizing legislation but the database was not in operation as of December 2015. Guam and Missouri were excluded from this analysis. Authorization data was unavailable for Guam and Missouri does not have a law authorizing the establishment of a PDMP.

Sources: IJIS Institute; survey conducted by Brandeis University PDMP Center of Excellence and The Pew Charitable Trusts from November to December 2015; see Appendix E; State of California Department of Justice, Office of Attorney General

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Criteria and thresholds for unsolicited reporting vary by state. These reflect differing judgments on patient risk measures (e.g., what threshold constitutes likely multiple provider episodes) and their impact on report volume (the lower the threshold, the greater the number of reports generated); the varying capacity of each program's staff to manage the unsolicited reports; and concerns about higher rates of false positives.¹¹⁹ Research is needed to develop a consensus on what risk measures and what thresholds of such measures would be most effective in the proactive dissemination of PDMP data.¹²⁰

So-called user-led unsolicited reports are generated by prescribers themselves and sent to their peers treating the same patient. This could be done in addition to state-generated unsolicited reports. Because such reports are sent at the discretion of the prescriber, there is no set threshold that triggers them, rather a judgment that the patient may be receiving a potentially harmful amount of controlled substances or a dangerous combination of them. In this process, after requesting a patient's controlled substance prescription history report, prescribers can use the PDMP portal to email a link to the report to others who have prescribed these drugs for the patient.¹²¹ This allows prescribers to initiate alerts to peers who otherwise may not learn of a patient's controlled substance prescriptions, thus amplifying the impact of PDMP data.

Evidence of effectiveness

Case studies of PDMPs suggest that unsolicited reports can increase prescriber utilization in two ways: by informing prescribers about the existence of the PDMP and motivating them to enroll to view a patient's controlled substance prescription history, and by prompting prescribers to query the PDMP for information on the patient identified in the report or alert if they are already enrolled. Nevada initiated its PDMP by sending unsolicited reports to prescribers about patients potentially engaging in multiple provider episodes. These reports likely generated interest in the PDMP among prescribers and may have been an impetus for further requests for data (i.e., solicited reports).¹²² The number of unsolicited reports rose from 182 in 1997 to 652 in 2002, while solicited reports increased from 480 to 10,935. Utilization data from the Wyoming PDMP also suggest that unsolicited reports helped to raise awareness of the PDMP, leading to more requests for data. The increase in queries (524 in October 2008 to 949 in September 2009) was associated with a subsequent 77.2 percent decline in the number of individuals identified in the PDMP database who met multiple provider episode thresholds.¹²³ In Wyoming, both unsolicited reporting and the timeliness of PDMP data (Wyoming had just moved to weekly reporting) incentivized prescriber use of the PDMP and may have contributed to a reduction in patients meeting the state's threshold.

A survey of prescribers in Maine found that unsolicited reports identifying patients with multiple provider episodes triggered clinically relevant action: 75.2 percent of prescribers usually or always discussed reports with patients, 18.7 percent usually or always called pharmacists who had dispensed to these patients, and 62.5 percent usually or always established a pain management agreement (a contract that outlines a patient's role in the treatment, the provider's responsibilities, and the conditions for terminating treatment).¹²⁴

Regarding appropriate and informative criteria for triggering unsolicited reports, Massachusetts established a threshold of four or more prescribers and four or more pharmacies in a year as the basis for questionable activity.¹²⁵ In an analysis of California PDMP data, researchers found that the likelihood of a patient's receiving opioids from multiple providers doubled when that individual was being prescribed other classes of controlled substances such as benzodiazepines or stimulants, suggesting that multiple provider episode thresholds should include those drugs.¹²⁶ To assess the impact of an intervention designed to reduce buprenorphine diversion in France, another study used the degree of overlap of prescriptions to the patient by multiple prescribers as a measure.¹²⁷ Tactics such as these could be used to identify patients for unsolicited reporting.

While unsolicited reporting as described in this report focuses on alerts sent to prescribers, CDC recommends that PDMPs should provide “unsolicited reports on high-risk providers and patients to the appropriate providers, regulatory boards, as well as law enforcement agencies under certain circumstances, such as an active investigation, court order or subpoena.”¹²⁸

Perspectives on implementation

Before the advent of electronically accessible PDMP databases and email communication, unsolicited reports were delivered via U.S. mail, a costly and comparatively labor-intensive process, or by fax. Some states continue to send a report to each of the patient’s prescribers by U.S. mail. This option is used when an electronic delivery mechanism has not been implemented or when prescribers are not enrolled in the database.¹²⁹ To facilitate use of unsolicited reports, the PDMP staff usually provide guidance, written or online, to prescribers about how to interpret and use PDMP data in their practice.

Generally, whether alerts are mailed or sent electronically, they do not contain identifying patient information; instead they prompt the prescriber to query the PDMP to view the controlled substance history, thereby posing virtually no privacy risks. For example, prescribers in Massachusetts receive unsolicited reports that include a patient record identification number, which must be entered after logging in to the PDMP to view the patient’s controlled substance records.¹³⁰

If valid prescriber email addresses are available, unsolicited reporting can be, to a great extent, automated. After analyses of PDMP data to identify patients meeting reporting criteria, emails are sent to the corresponding prescribers. Messages instruct these prescribers to either query the PDMP with a specific patient record number (as described for Massachusetts), or log in to their accounts to see which patient(s) have met the alert threshold. The entire process, from data analysis to alert generation, can be scheduled to run automatically—weekly, monthly, or at other specified intervals. Some systems, such as the one in Massachusetts, include a “no-repeat” function so that prescribers will not receive more than one alert about a specific patient in a given period (e.g., three months) even if that patient meets the alert threshold at more frequent intervals. This can help reduce “alert fatigue” among providers. Limiting the frequency of alerts does not prevent a prescriber from checking the PDMP at any time.

Efficiencies in unsolicited reporting may be achieved if a PDMP vendor designs and makes available to its client (in this case, the state) a prepackaged analysis and alert system. However, “in-house” design of alert systems may provide a greater opportunity for innovation, and more flexibility in optimizing unsolicited reporting in response to changing needs. For example, a PDMP may track simultaneous prescribing of controlled substances that may dangerously interact or have additive effects. Once designed and in place, electronic unsolicited reporting, unlike mailed reports, places relatively little demand on PDMP staff.

Barriers to unsolicited reporting can include a lack of legal authority to issue unsolicited reports and insufficient PDMP resources to design and build a reporting system, carry out the requisite data analyses, and issue alerts, whether by mail or electronically. Valid email addresses for prescribers can sometimes be difficult to obtain. In addition, some argue that unsolicited reporting is rendered superfluous if a state mandates that prescribers consult PDMP data before first prescribing to a patient and at intervals after that. However, unsolicited reports can alert a prescriber to a potential problem with a patient in a timely manner, and prior to the next scheduled check of the PDMP, thus identifying the problem sooner. More research is necessary to determine whether unsolicited reports add significantly to prescriber awareness of possible at-risk patients in states that have

adopted strong prescriber mandates. In states without a mandate, unsolicited reporting is an effective way to encourage use of the database and to communicate with unenrolled prescribers about the value of PDMPs.

Current status of adoption

Considerable opportunity remains for further adoption of unsolicited reporting by states as demonstrated by a gap between states allowed to send unsolicited reports and those engaged in sending such reports: As of September 2015, 44 states and the District of Columbia had authority to implement unsolicited reporting, though just 32 PDMPs were engaged in this practice by the end of the year.¹³¹ While most PDMPs issue unsolicited reports to prescribers, the criteria for identifying patients who are the subject of these alerts have not been standardized across states.

Case studies on unsolicited reports

Maine enhances unsolicited reporting with electronic alerts, prescriber-set thresholds

Maine not only authorizes analysis and reporting of PDMP data to prescribers for patients meeting preidentified risk criteria, but its regulations also require it.¹³² Since starting unsolicited reporting in 2005, the PDMP staff has enhanced this function by sending alerts via email, establishing additional thresholds for generating unsolicited reports, and allowing prescribers to set the threshold for receiving alerts specific to their practice.¹³³

Although regulations recommend certain types of reporting criteria (e.g., a high number of prescribers over a short period of time), the selection of criteria, as well as the frequency of reporting, is left to the state's Office of Substance Abuse and Mental Health Services, the agency that houses the PDMP. Since 2005, in addition to standard unsolicited reports triggered by meeting a threshold for multiple provider episodes, reports are triggered when a patient's dose of acetaminophen from a combination of prescribed drugs containing opioids and acetaminophen (e.g., Vicodin, Percocet) exceeds a specified safe daily allowance, and when buprenorphine and another opioid are co-prescribed in a 30-day period. Starting in June 2014, prescribers could request multiple provider episode reports using customized thresholds that are potentially stricter than the agency standard.¹³⁴ The value of this option is illustrated by pain management agreements between prescribers and patients, which often require patients to receive opioids from just one prescriber. In this scenario, the threshold for monitoring the agreement would be receiving opioids from two or more prescribers in a given time period.

Decisions to add reporting criteria and undertake other improvements to unsolicited reporting are made in consultation with the PDMP Advisory Committee, which consists of medical providers, boards of licensure, organizations representing pharmacy and medical practitioners, members of the Medicaid office, Maine Quality Counts (a quality improvement organization), pharmacy schools within the state, and the Veterans Administration. Two new criteria for alerts were added in 2015: multiple overlapping prescriptions for medications containing opioids, and prescriptions for more than 300 morphine milligram equivalents daily for more than 45 consecutive days within a 90-day period. As a result, Maine now has five different criteria for issuing alerts to prescribers. When a new one is added, it is considered a system enhancement for which the vendor charges a fee to Maine's Office of Substance Abuse and Mental Health Services (in addition to the contract covering standard operations). Funding for the two most recent criteria additions came from a privately funded grant from the National Association of State Controlled Substances Authorities, a stakeholder group that works with state and federal agencies and pharmaceutical company representatives to reduce drug diversion and misuse.¹³⁵ The PDMP staff made the case in a grant application that tracking the risk measures under consideration would help the program meet its goals.

Other enhancements to Maine’s approach to unsolicited reporting have been made incrementally. Until recently, Maine sent unsolicited reports, which it calls “threshold reports,” via U.S. mail on a quarterly basis. The PDMP now uses electronic alerts sent on a monthly basis via email to notify providers that they can view a report by logging in to the database. The automated data analyses and email alerts are managed by Maine’s PDMP vendor. Therefore, issuing unsolicited reports requires little staff time or oversight, apart from setting the threshold and fielding questions from prescribers about the reports. The vendor’s cost for completing these activities is built into the contract, not charged on a per-report basis. In addition to sending electronic alerts to enrolled prescribers, the PDMP staff send hard copy unsolicited reports via U.S. mail to prescribers not enrolled in the PDMP to mailing addresses obtained from licensing boards. Unlike electronic alerts, these reports contain the patient’s prescription history for monitored controlled substances. The reports therefore alert the prescriber, provide information that can be used in clinical decision-making, and promote the PDMP as a clinical tool, thereby helping to encourage enrollment.

Outcomes and process measures

Unsolicited reporting may have contributed to declines in multiple provider episodes and rates of prescribing. Maine PDMP data analyzed as part of Prescription Behavior Surveillance System activities show a steady decline in the annual rate of multiple provider episodes from five per 100,000 residents in 2010 to 3.2 per 100,000 residents in 2014.¹³⁶ From 2012 to 2013, rates of prescribing for opioids and benzodiazepines declined by 5.6 and 5.1 percent, respectively, although stimulant prescribing rose by 1.6 percent.¹³⁷

In 2009, the University of Maine surveyed prescribers licensed to prescribe controlled substances (a 20.2 percent response rate). Researchers found that receiving an unsolicited report is associated with PDMP registration and use.¹³⁸ The 451 respondents who received an unsolicited report were significantly more likely to register than respondents who had not received the reports, 73 percent compared with 27 percent ($p < .001$).

Indiana implements user-led unsolicited reporting

Indiana was one of the first states to create “user-led” unsolicited reports,¹³⁹ those generated by PDMP-registered users and distributed to peers who prescribe to the same patient (Wisconsin has also adopted such a system, based on the Indiana model).¹⁴⁰ Prescribers who receive these notifications are prompted to review the controlled substance prescription history of the patient. Because only prescribers registered with the PDMP can access these histories, the notification also serves to motivate those not registered to enroll in the PDMP, and information on how to register is included.

The user-led system, which formally launched in April 2012, was piloted with 52 PDMP users who gave feedback on problems they encountered as well as suggestions for improved functionality. This system was launched after outreach to 35,000 practitioners that provided a description of the new functionality along with instructions on how to send the reports. To facilitate sending user-led reports to prescribers not enrolled in the PDMP, staffers uploaded 16,554 practitioner email addresses obtained from the Indiana Professional Licensing Agency.¹⁴¹

To study the state’s approach, the Indiana University Center for Health Policy analyzed de-identified data from 2011 to 2013 to compare two thresholds: the state-determined threshold for PDMP-issued reports and a threshold used by the Bureau of Justice Assistance’s Harold Rogers PDMP grantees (i.e., patients receiving opioids from five or more prescribers and five or more pharmacies within three months).¹⁴² During the three-year study period, 128 unique patients met the Indiana threshold compared with 2,972 unique patients meeting the BJA threshold. This difference shows the potential effect that variable thresholds have on the

number of unsolicited reports generated. The more conservative threshold used by Indiana will produce fewer false positives, but at the cost of missing some patients likely engaging in multiple provider episodes. The researchers recommended that the PDMP adopt the BJA threshold and work with other state agencies to develop interventions for patients who may be using opioids inappropriately.

As of September 2016, Indiana has suspended PDMP-issued unsolicited reporting pending possible updates to the system for delivering alerts to providers.¹⁴³ Indiana's standard PDMP-issued unsolicited reports have previously been sent to prescribers who have patients receiving controlled substance prescriptions from 10 or more prescribers in a continuous 60-day period. Therefore, little PDMP staff effort had been necessary for their distribution.

Outcomes and process measures

After the state launched user-led unsolicited reporting, it was rapidly adopted by prescribers. During the first month, 128 prescribers sent 1,549 alerts. The following month, 140 prescribers sent 2,284 alerts.¹⁴⁴ In 2014, most user-led reports (84.5 percent) were sent to individuals not enrolled in the PDMP.¹⁴⁵

The number of patients meeting the Indiana multiple provider episode threshold rose from 78 in 2013 to 139 in 2014. As a result, there was a 19 percent increase in the number of enrolled prescribers receiving PDMP-initiated unsolicited reports on these patients, and a 13 percent increase in the number of unenrolled prescribers receiving unsolicited reports on these patients.¹⁴⁶ Unsolicited reports can prompt prescribers to view PDMP data, thus increasing enrollment and use of the PDMP. When sent to unenrolled prescribers, both types of unsolicited reports may have alerted some people to the PDMP and the value of its data, helping to encourage enrollment. Those sent to enrolled prescribers likely prompted them to view PDMP data on their patients, thus increasing utilization. In addition, user-led unsolicited reports are issued by prescribers, not the PDMP, further reducing the workload. The only costs associated with user-led reporting were for developing the software system.¹⁴⁷

Massachusetts transitions to electronic unsolicited reporting, analyzes alerts

The Massachusetts PDMP first issued unsolicited reports to prescribers by mail in 2010.¹⁴⁸ Mailed reports were time-consuming to produce and send, and they contained confidential patient information. Therefore, in 2013 the PDMP staff developed a system of electronic alerts to replace them.¹⁴⁹ The development, testing, and rollout took place over a yearlong period.¹⁵⁰

Recipients of alerts, which are issued on a monthly basis, are notified when a patient in their practice meets a multiple provider episode threshold for possible inappropriate use. The threshold used for triggering alerts is kept confidential to prevent individuals from intentionally avoiding detection. The alerts include a patient record identification number that prescribers can use to query the PDMP in order to view the patient's controlled substance prescription history. Only prescribers enrolled in the program with valid email addresses receive these notifications.

PDMP staff members determined the criteria for triggering reports and how often they are sent in consultation with the program's Medical Review Group, which is composed of prescribers and pharmacists. The group will also be consulted if changes to alert thresholds are considered necessary. The electronic system includes a no-repeat function that prevents prescribers who have received an alert on a particular patient from being notified about the same patient again during a specified interval, thus reducing "alert-fatigue." The alert system was developed with the vendor and tested on mock data prior to launch. The staff experienced no significant implementation barriers.

Outcomes and process measures

Several analyses to determine the effects of unsolicited reporting in the state found that most prescribers were not aware of the controlled substance prescriptions their patients received from other prescribers. The PDMP staff plans to continue tracking the effect of alerts by analyzing PDMP data for utilization, changes in prescribing behavior, and changes in numbers of patients meeting specified multiple provider episode thresholds.¹⁵¹ This analysis will require an ongoing commitment of staff resources.

A case-control study that compared matched groups of patients who were the subject of reports with those who were not found statistically significant declines in numbers of pharmacies visited and average days' supply of medications ($p < 0.05$) in the year after issuance of unsolicited reports.¹⁵² These data suggest that the paper-based unsolicited reports positively influenced prescribing to, and pharmacy use by, patients who were the subjects of reports.

Prescribers receiving electronic alerts in 2013 and 2014 were invited to respond to a survey to assess their satisfaction with and the impact of alerts. Only 24 percent of respondents reported being aware of all of the other prescribers providing controlled substance prescriptions to their patient. Seventy-three percent thought the alerts were either very or somewhat useful, and 85 percent reported that viewing PDMP data, as prompted by the unsolicited report, increased their confidence in how or whether to prescribe controlled substances to the patient.¹⁵³

PDMP data from December 2013 through June 2014 indicated that prescriber searches on patients increased by approximately 10 percent; first-time use of the system by registered prescribers also increased. For almost 80 percent of patients identified in the alerts, prescribers searched the patient's prescription information within days of being notified.¹⁵⁴ By providing access to clinically relevant information, these reports also helped to demonstrate the PDMP's value to prescribers, a further inducement for them to regularly use the system.

Beyond increasing utilization, the alerts may have had an effect on prescribing and therefore on whether patients identified in the alerts continued to meet the alert threshold. Among patients for whom an alert was sent, nearly 60 percent did not meet the alert threshold for the following six months. Less than 2 percent (five patients) met the threshold in each of the six succeeding months.¹⁵⁵

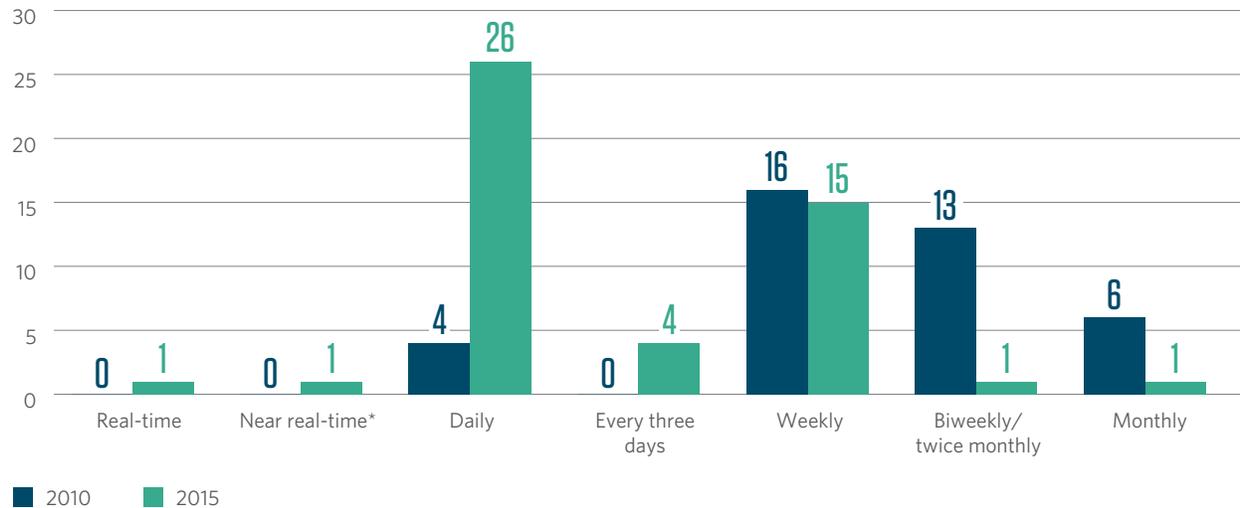


Data timeliness

PDMP databases are populated with information that dispensers transmit on filled controlled substance prescriptions. Data are transmitted in batches at intervals ranging from monthly to daily, although pharmacies in Oklahoma transmit data on individual transactions within five minutes of the point of sale. Data are checked by the PDMP or its vendor for completeness and accuracy using computer algorithms. If data meet the minimum requirements for completeness, they are uploaded to the PDMP database within minutes of being received from the pharmacy. Incomplete records or a batch file containing incomplete records will be returned to the pharmacy for correction. Since most files are accepted for immediate upload, the timeliness of prescription data predominantly depends on the pharmacy reporting interval set by PDMP regulations.¹⁵⁶

Figure 7

How Often Dispensers Are Required to Input PDMP Data, 2010 vs. 2015



Notes: The 2010 data reflects survey responses from 39 states with authorized PDMPs, including those not yet operational. West Virginia did not respond to the survey and is not included in this analysis.

The 2015 data includes 49 operational PDMPs and does not include the District of Columbia, Missouri, and Pennsylvania. The District of Columbia PDMP was not operational as of December 2015. Missouri does not have a law authorizing the establishment of a PDMP. The Pennsylvania PDMP transitioned to the state Department of Health, and data for this measure was unavailable. This analysis reflects the updated status of four states with new requirements effective January 1, 2016: Indiana, Oregon, Tennessee and Wyoming (see Appendix E).

* Nebraska dispenser data is made available to the PDMP through the health information network Surescripts on a near-instantaneous basis, but some pharmacies submit data on a daily basis.

Sources: John Eadie, PDMP Center of Excellence at Brandeis University; survey conducted by Brandeis University PDMP Center of Excellence and The Pew Charitable Trusts from November to December 2015; see Appendix E

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Evidence of effectiveness

The usefulness of PDMP data is dependent on its accuracy and timeliness.¹⁵⁷ If a report does not include information on the most recent controlled substances dispensed, prescribers miss important information about the nature and quantity of controlled substance medications in the patient's possession, as well as information about the patient's other recent prescribers, for example, from emergency departments.¹⁵⁸ Prescribers will be more likely to make use of PDMP data if they perceive it to be a clinically useful tool. Because the timeliness of prescription data increases its utility, this suggests that reducing the pharmacy reporting interval will help to incentivize prescriber use. It may also improve data quality since data are checked and sent for correction, if necessary, at more frequent intervals. In turn, this could increase the value of PDMP information to prescribers, helping to encourage its use.

Given these considerations, many states have moved to shorten their reporting intervals. However, there is no stakeholder consensus on whether the additional timeliness of collecting real-time data, compared with daily reporting, justifies the costs of setting up a real-time data collection system.¹⁵⁹ Prescribers are perhaps more attuned to the advantages of having the most recent prescription data on their patients, while pharmacies are more concerned about the costs and workflow disruption involved with adopting real-time reporting. Additional research is needed to determine the value added to PDMP end users from having continuously updated PDMP data. As states implement the electronic prescribing of controlled substances, real-time reporting to PDMPs may become more technologically feasible and cost-effective, thereby increasing the likelihood that it will become the standard.

Perspectives on implementation

Shortening the PDMP reporting interval may require pharmacy IT system upgrades and more frequent data submissions by pharmacies, which PDMPs and their vendors must be prepared to process. This may require increased staff efforts for pharmacies and the PDMP, at least in setting up new procedures. As Oklahoma's experience illustrates, real-time reporting at the point of sale may involve significant changes in pharmacy data transmission systems and modifications to PDMP procedures. The transition to real-time data collection thus requires a substantial investment, in planning, staff time, and resources, on the part of pharmacies and the PDMP. Once in place, however, the operating costs are low and comparable to those for daily batch transmission.¹⁶⁰

Many states have shortened the reporting interval, which indicates that this enhancement is feasible for most states. Kentucky's experience indicates that the move from weekly to daily reporting need not involve significant system changes. The fact that only one state (Oklahoma) has adopted real-time reporting suggests that, at least for the time being, the technical, financial, and organizational barriers to this upgrade are not easily overcome. This may change, however, as experience accumulates in developing real-time systems, and the requisite technology decreases in price.

CDC Supports Timely Data Submission Requirements

In February 2016, the Centers for Disease Control and Prevention (CDC) released Prevention Status Reports (PSRs) for all 50 states and the District of Columbia. These reports use a three-level rating scale (green, yellow, red) to show the extent to which a state has implemented a policy or practice in accordance with supporting evidence and/or expert recommendations. CDC said requiring timely data submissions to the PDMP is supported by emerging evidence, expert consensus, and review of the primary drivers of the prescription drug overdose epidemic.

As of July 31, 2015, 23 states received green ratings for requiring daily data submissions. Twenty-four states received yellow ratings for having data submission requirements between daily and weekly. Four states (Alaska, Missouri, Montana, and Nebraska) received a red rating for requiring data uploads less frequently than weekly or not having a reporting requirement.¹⁶³

Current status of adoption

PDMPs have moved to require more frequent reporting from pharmacies. In 2010, six of the 39 authorized PDMPs (15.4 percent) required monthly reporting, 13 (33.3 percent) required biweekly (twice monthly) reporting, 16 (41 percent) required weekly reporting, and four (10.3 percent) required daily reporting.¹⁶¹ By December 2015, just one PDMP (Alaska) still used monthly reporting and one (Guam) had biweekly reporting, while 15 (30.6 percent) had weekly reporting and 26 (53.1 percent) required daily reporting. Of the remaining PDMPs, four had 72-hour reporting, and one (Oklahoma) had real-time, point-of-sale reporting. One state (Nebraska) makes dispenser data available in near real time through the health information network Surescripts; however, this does not necessarily result in immediate reporting because some pharmacies submit data to that network on a daily basis.¹⁶²

Case studies on data timeliness

Oklahoma pioneers real-time PDMP updates

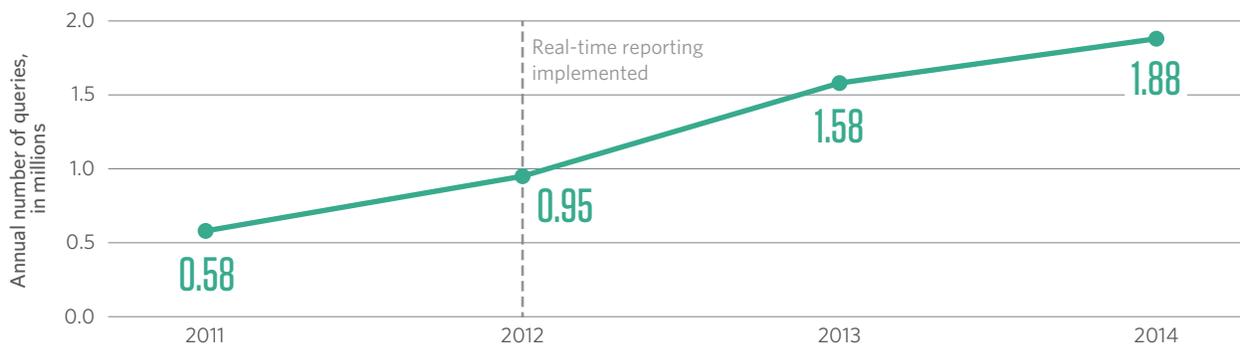
Effective January 2012, Oklahoma instituted real-time, or point-of-sale, reporting of controlled substance dispensing information for the more than 1,000 dispensers in the state. This action was the culmination of intensive stakeholder collaboration to build support for the initiative, reach consensus on the development plan, and carry out the necessary IT and workplace modifications.¹⁶⁴ Instead of transmitting a batch at predefined intervals, pharmacies now upload data continuously as triggered by the sale and delivery of controlled substance prescriptions to customers. The Oklahoma experience demonstrates the feasibility of real-time reporting, should a state decide that continuous updates add more value than daily updates of controlled substance prescription histories. Prior to initiating real-time reporting, in April 2010, Oklahoma reduced its reporting interval from monthly to daily.

The adoption of real-time reporting was driven by prescriber concerns—especially those of emergency department physicians—that daily reporting can result in a controlled substance prescription history report that is incomplete at the time of a patient encounter. However, legislators and pharmacy stakeholders were concerned that implementing such a system would disrupt pharmacy workflow and be costly.¹⁶⁵ The PDMP project team formed an advisory committee to ensure that the perspectives of all parties affected by the project were taken into account. The committee included representation from chain and independent pharmacies; software and data collection vendors; professional licensing boards; trade organizations; emergency room, primary care, and veterinary providers; and state regulatory agencies. Stakeholders considered concerns and expertise from participants, and the PDMP team learned about pharmacy policies, data handling, and workflow, thereby reaching agreement on the project plan. The PDMP team then worked closely with legislative committees to create support for the project and built in sufficient lead time to enable pharmacies to meet the deadline for the system's launch.¹⁶⁶ Legislation requiring the move to real-time reporting by January 2012 was passed in 2009.¹⁶⁷

The transition to real-time reporting took two years. The PDMP staff managed software programming internally;¹⁶⁸ and work to develop and implement real-time reporting was the primary focus of PDMP staff members for much of 2011, involving intensive effort and overtime. Pharmacies redesigned data systems and workflow procedures, and the PDMP reconfigured its operations by adding servers, software capability, and help desk capacity. By May 2011, nearly 30 percent of pharmacies were reporting in real time, eight months before the requirement went into effect.¹⁶⁹ After some fine-tuning during the rollout phase, the system now functions as intended and has not encountered any major technical difficulties.¹⁷⁰ Ongoing maintenance of the system requires minimal effort.

The state's estimated \$21,000 project cost was covered within the operating budget. Pharmacies also incurred costs, including new administrative procedures, and hardware and software conversions.¹⁷¹ The return on investment in real-time reporting includes speedier error correction, improved data quality, and more accurate accounting of the controlled substance prescriptions that patients received.¹⁷²

Figure 8
Queries to Oklahoma's PDMP, 2011-14



Source: Oklahoma PDMP

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Process and outcomes measures

The precise contribution of real-time controlled substance prescription information to the increased utilization of PDMPs by prescribers cannot be measured, and prescriber perceptions of increased utility and other factors may have played a role in encouraging greater use of the PDMP. However, prescriber utilization and enrollment did increase markedly in the years after the implementation of real-time reporting. Queries associated with practitioner accounts rose 62.9 percent between 2011 (the year prior to full implementation of real-time reporting) and 2012. The trend continued through 2014 (the latest year for which query data were available for this report), with utilization three times what it was in 2011.¹⁷³ By December 2015, enrollment had increased to 86 percent of DEA-registered prescribers, up from just 24 percent in the last quarter of 2011.¹⁷⁴

After introduction of real-time reporting, the PDMP staff experienced increased requests from hospitals wanting to set up delegate accounts to facilitate emergency department access to PDMP data.¹⁷⁵ Anecdotally, emergency department staffers also expressed satisfaction with the improved timeliness of prescription information.¹⁷⁶

Kentucky requires daily PDMP updates after considering real time

Kentucky dispensers transitioned from weekly to daily controlled substance data reporting in July 2013, as required by law after the passage of H.B. 1, which was a broad legislative initiative that also included a mandate for prescribers to query the PDMP. To inform the decision on the optimal reporting interval, the state commissioned a study by the University of Kentucky to determine the costs and benefits of adopting real-time reporting.¹⁷⁷

Researchers surveyed independent pharmacists, nonpharmacy dispensers (veterinarians and physicians), the Oklahoma PDMP administrator (who had experience implementing real-time reporting), representatives from pharmacy chains, and pharmacy software vendors to assess their views of real-time data submissions.

Participants from all segments of the research questioned the value of real-time reporting. Concerns cited included costs associated with the transition, workflow issues, and potential decreases in data quality. The study concluded that daily transmissions would improve the information available to prescribers and dispensers at little or no cost to dispensers and therefore recommended daily submissions, among other strategies, to increase PDMP utilization.

The Cabinet for Health and Family Services, which houses the PDMP, and Kentucky legislators accepted this assessment in adopting daily reporting as part of the 2012 law. The law defines daily reporting as transmission of prescription data no later than the close of business on the business day immediately after the dispensing.¹⁷⁸ This means that prescriptions dispensed on weekends might not be reported to the PDMP until the close of business on Monday.

This enhancement did not require any system changes for the PDMP's data collection vendor, which already received and consolidated files from many pharmacies on a daily basis. The number of files received daily increased after the reporting requirement went into effect.¹⁷⁹ The PDMP itself did not incur direct costs. However, some additional staff time was necessary to identify and follow up with dispensers who did not immediately begin daily reporting due to a lack of awareness about the new reporting requirements. Overall, the transition from weekly to daily reporting required a small investment of time and effort by the PDMP staff.¹⁸⁰

Process and outcomes measures

In a 2015 post-implementation evaluation of H.B. 1, the University of Kentucky found that the transition to daily reporting was initially difficult for some pharmacies. As part of that evaluation, which also included perspectives on the use mandate, researchers interviewed 78 pharmacy, nursing, medicine, dentistry, law enforcement, and Medicaid stakeholders, including representatives from state licensing boards and professional associations. Pharmacist participants reported that daily reporting was a hurdle because software sometimes inadvertently reverted to weekly reporting, which required ongoing vigilance on their part.¹⁸¹ Pharmacy software vendors have since resolved this issue.¹⁸²

Changes in prescriber behavior and patient outcomes (e.g., decreased numbers of controlled substance prescriptions, reduced numbers of patients meeting the PDMP's threshold for multiple provider episodes) are attributable to H.B. 1 policies that included a change to the frequency of data submission, mandated use of the PDMP, and work to target pill mills. These outcomes are described in greater detail in the Kentucky mandated use case study. (See Page 12.)

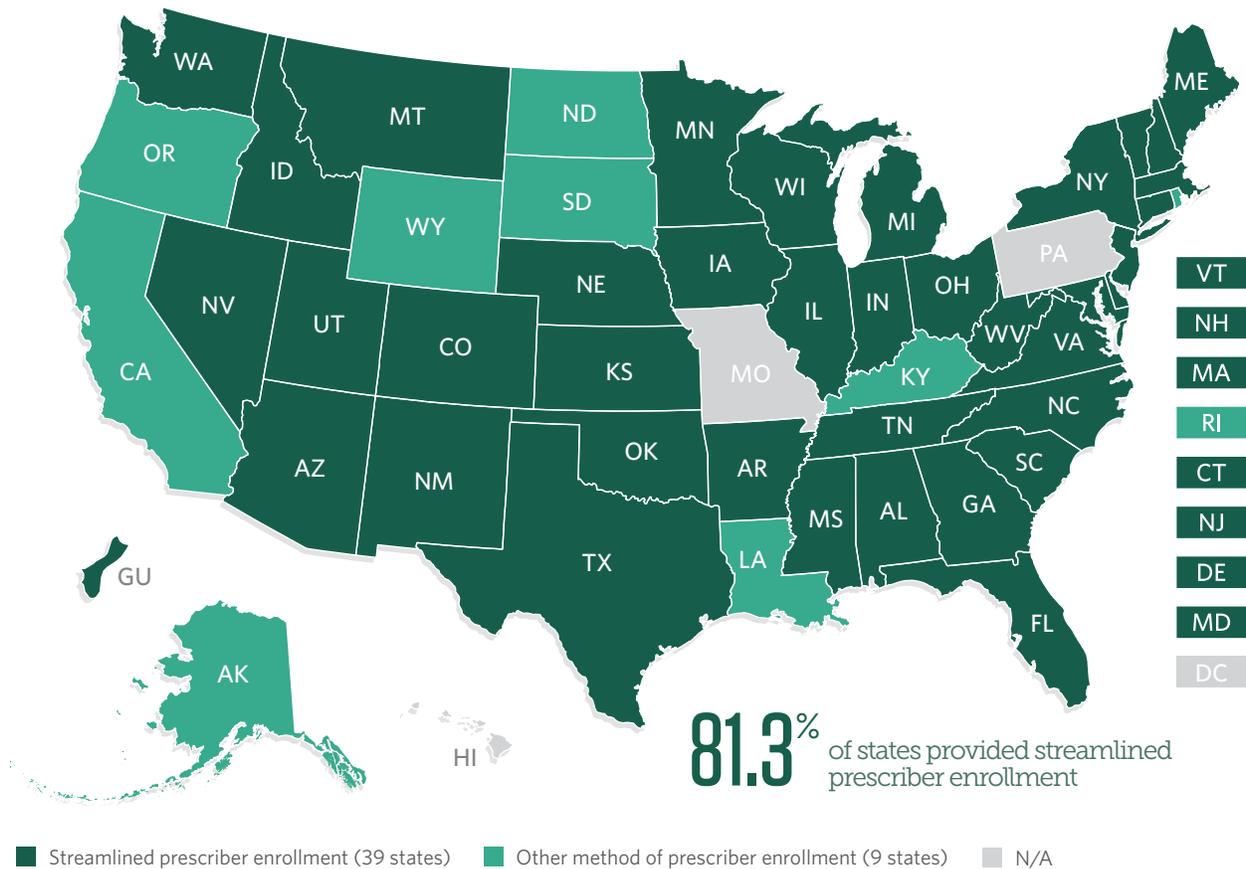


Streamlined enrollment

Before prescribers can access PDMP data, they must establish secure online accounts with the system. This involves providing identifying information that can include name, date of birth, state controlled substance prescribing or medical practice license number, DEA registration number, driver's license number, place of employment, medical specialty, and contact information. The account is approved after verification that the applicant has a valid state controlled substance license or medical practice license and a DEA registration number; the prescriber then receives instructions for online account access using a login ID and password,

at which point the prescriber can query patients' controlled substance prescription histories. The application process varies; some PDMPs require signed, hard copy notarized application forms sent by mail or fax, or scanned and sent electronically. Other programs have implemented streamlined enrollment processes such as automatic online application systems that do not require notarization but instead validate an applicant's identity and state and DEA prescriber status by accessing existing government licensing databases. Because PDMP data are confidential patient health information, it is important for application systems to ensure that only legitimate prescribers in good standing and their authorized delegates are allowed to establish accounts and obtain controlled substance prescription history reports.

Figure 9
States That Streamline Prescriber Enrollment in PDMPs



Note: Streamlined enrollment includes online registration and automatic registration triggered by a state controlled substance registration or medical license renewal. Other methods of enrollment include paper-based registration and notarization requirements. Data reflects survey of 48 operational PDMPs. The District of Columbia, Hawaii, Missouri, and Pennsylvania are not included in this analysis. The District of Columbia PDMP was not operational as of December 2015. Hawaii officials did not respond to this survey. Missouri does not have authority to establish a PDMP. The Pennsylvania PDMP transitioned to the state Department of Health, and data for this measure was unavailable.

Source: Survey conducted by Brandeis University's PDMP Center of Excellence and The Pew Charitable Trusts from November to December 2015; see Appendix E

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Evidence of effectiveness

A survey of nurse practitioners in North Dakota found that time-consuming application procedures, including filling out, notarizing, and mailing application forms, can be a deterrent to PDMP enrollment.¹⁸³ This suggests that making it easier to apply for a PDMP account could help to encourage prescriber registration.¹⁸⁴ In response, many states have implemented online, automated registration systems to help expedite enrollment. In addition, some states that require prescribers to have PDMP accounts have adopted enrollment systems in which applications for, or renewals of, state professional licenses or controlled substance registrations automatically trigger registration in the PDMP.

Online paperless registration systems can increase the capacity of PDMPs to process enrollments. Although automatic PDMP registration linked to professional license applications and renewals will eventually achieve close to 100 percent enrollment, this may take several years, depending on the license renewal interval set by each state.

Perspectives on implementation

Processing paper-based applications from prescribers, such as data entry and validation, filing documents, assigning login information, and mailing responses, can involve considerable staff time. States that require notarization of application forms will sometimes host PDMP education and training events at which a notary is present, making enrollment as easy as possible for attendees. The total time between application and the establishment of an account can take anywhere from days to weeks for paper-based systems.

In-house development of an online registration system requires an initial investment of IT resources to design the necessary sharing of information between databases. After implementation, such systems require relatively little staff effort compared with processing paper-based applications. Some PDMP vendors have off-the-shelf web-based registration systems that have flexibility in adapting to a state's data communication and security requirements. In online automated systems, accounts can be established in as little as a few minutes, depending on whether all data elements are present and match, for example, a prescriber's name in the DEA database, driver's license, and state controlled substance license databases. Such systems still require manual processing of applications that are missing data or are rejected by automated data-matching.

Barriers to streamlining prescriber PDMP enrollment can include insufficient technical, staff, and financial resources. However, the expected return in future labor savings, expedited registration, fewer data errors, and increased PDMP enrollment and utilization can incentivize this investment. Concerns also exist that dropping the notarization requirement in favor of online data validation unacceptably heightens the risk of fraudulent applications, breaches of data security, and misuse of patient information. Research is necessary to estimate the extent to which online automated registration without notarization increases the risk of fraudulent accounts and illicit access to PDMP data. In researching this report, no instances came to light of fraudulent accounts being established via non-notary systems.

Current status of adoption

A majority of states (39) have implemented streamlined registration systems, most of which require no notarization or submission of supporting documents.¹⁸⁵ As of September 2015, 26 states required prescribers to establish accounts with the PDMP.¹⁸⁶ Of these, at least four states—Maine, Massachusetts, New Mexico, and Rhode Island—have systems that link enrollment applications with controlled substance registration renewals or applications, which is one method of streamlining enrollment.¹⁸⁷

Some online systems require electronic submission of supporting documents, after they have been notarized. Notarized hard copies of documents may still be considered the most reliable means of authenticating prescriber identity, but states seem to be moving toward online systems that lessen the time necessary to both fill out and process applications, while maintaining adequate security and authentication.

Case studies on streamlined enrollment

Tennessee uses online registration to facilitate implementation of use mandate

Tennessee adopted an online registration system to handle an anticipated increase in applications after passage of a 2012 law mandating that prescribers use the PDMP and that dispensers enroll. Under Tennessee's comprehensive mandate, prescribers must check the PDMP before providing an initial prescription for opioids or benzodiazepines, and annually after that if treatment continues. The law also requires DEA-registered prescribers and dispensers to enroll in the database, effective Jan. 1, 2013, nearly eight months after the law's enactment. New licensees are required to enroll within 30 days. The use mandate went into effect four months after the registration requirement.¹⁸⁸ The online registration system supported the rapid increase in prescriber utilization of the PDMP.

The PDMP administrator and the IT vendor collaborated in developing the automated application system. The old registration process included a form that was filled out online and processed manually. The new system automatically attempts to validate the prescriber's information using electronic databases for the state's professional health care licenses, driver's licenses, and DEA prescriber registration.¹⁸⁹ To ensure that prescriber names would match across databases and to minimize the number of applications that had to be manually processed, prior to launching the system PDMP staff members worked to resolve inconsistencies among prescriber names. Applications for prescribers, such as medical residents in hospitals, who do not have health care licenses or DEA numbers must still be processed manually.

While development of the automated registration system required significant effort by PDMP staff, maintenance of the system involves relatively little cost or staff time. PDMP staff and the vendor continue to improve the automation and validation of registrations as well as login requests.¹⁹⁰

Process and outcomes measures

Several thousand applications were processed in only a few months after the mandate began.¹⁹¹ Beginning a year before the registration requirement went into effect through 2014, the number of individuals enrolled to use the PDMP increased by 127 percent (from 15,323 individuals in 2011 to 34,802 in 2013; 38,871 were enrolled by the end of 2014).¹⁹² Queries to the system increased from an average of 123,957 reports per month in 2011¹⁹³ to an average of 374,984 reports per month in 2013.¹⁹⁴ Although the legislative mandate was the driver of this increase, the online registration system likely played a key role in accelerating the rate at which applications could be processed. Without online registration, the level of utilization would not have increased as rapidly because user accounts would have been slower to come online.

Minnesota's online enrollment results in time savings

Minnesota implemented an automated system for registering PDMP users in 2012, replacing a previous paper-based process. The new system saves applicants the cost and time commitment associated with having their application notarized, and then mailing or scanning the documents. It also gives prescribers and pharmacists almost immediate access to PDMP data after applications are electronically approved. The speed and ease of registration likely helps to incentivize prescriber enrollment in the PDMP, while saving time that the PDMP staff would otherwise spend on manual processing of applications.

The registration process can be described as follows: When a Minnesota licensed prescriber or pharmacist submits an online application, the PDMP system checks to see if the applicant's state license number is in a database that is populated by a daily upload from the prescriber licensing boards and the pharmacy board. The database contains information only on licenses that are active and in good standing. If the license number is found, the name, date of birth, and last four digits of the Social Security number are verified. In order for the match to occur, the spelling of the first and last name must be identical. (If there is a disciplinary action in the licensing record, the application is put into a queue for manual processing.) Once the match occurs, the pharmacist's application is approved. For a prescriber, the DEA number is verified against a DEA file, which is regularly updated. If the DEA number is in the file, the name and date of birth are verified and must be identical for the match to occur. After a match occurs, an account is created and email notification is sent to the applicant. If verification is unsuccessful, an email notification is sent containing the reason for denial. Applications for prescribers with out-of-state medical licenses are placed in a queue, to be processed manually by PDMP staffers. Maintenance activities include the daily upload of licensing files and the downloading of the DEA file, all of which is handled outside of the PDMP office.¹⁹⁵

The automated registration system, which was funded as part of a federal grant, cost approximately \$13,000 to implement.¹⁹⁶ Startup involved considerable staff time to review existing spreadsheets of previously approved paper applications to backload information into the online application database. The PDMP staff spent numerous hours reviewing and comparing the application spreadsheets to the approved user account listing that was generated by the PDMP system vendor. No other significant barriers to implementation were reported. To date, no security problems have arisen from forgoing the notarization process.¹⁹⁷

Process and outcomes measures

The online registration yielded time savings for both PDMP staff and applicants. The time it took staff for document review, data entry, credentialing, and notification for each application under the manual system was on average some 12 minutes longer than the new, automated registration system. For the 933 applications approved using the automated process between Oct. 18, 2012, and March 31, 2013, PDMP staff saved approximately 187 hours, or 23 business days. Automated registration therefore frees up staff resources that can be assigned to other tasks. For applicants, the time needed to gain registration approval was reduced from up to seven days to 10 minutes.¹⁹⁸ Applicants have also provided positive verbal feedback to the PDMP staff, expressing satisfaction with the new system, with not needing to find a notary, and with the timely notification of their account credentials.¹⁹⁹

Massachusetts targets 100 percent enrollment with automatic registration

Starting in 2013,²⁰⁰ Massachusetts implemented a process to automatically enroll physicians, dentists, and podiatrists in the PDMP when those prescribers renew or apply for their Massachusetts controlled substance registration.²⁰¹ This enhancement, intended to facilitate a separate requirement to use the database, was

expected to achieve nearly 100 percent prescriber enrollment in the PDMP by fall 2015.²⁰² Under the new enrollment system, the PDMP no longer requires notarization of documents. Instead, prescribers receive notification and forms through the mail when their state controlled substance registration is due for renewal. These forms prompt the prescriber to provide the information required to establish a PDMP account. Prescribers can enroll voluntarily, in advance of their registration renewal, by downloading an enrollment form from the Drug Control Program within the Department of Public Health, which houses the PDMP.

Unlike Kentucky and Tennessee, which opted for rapid expansion of prescriber enrollment, Massachusetts took a less resource-intensive, staged approach by linking enrollment to the renewal of the state controlled substance registration, where registrations come up for renewal for practitioners (e.g., physicians, dentists, and podiatrists) every three years.

Because prescribers mail applications to the PDMP, staffers must process them manually. The interval between receipt of application and establishment of the account is typically one to two weeks. However, because prescribers are automatically prompted to register when applying for or renewing their state controlled substance registration, staff outreach to encourage or remind prescribers about enrollment is not necessary. It also results in a manageable, continuous workflow for PDMP staff tasked with processing registrations. The system has worked well to gradually and reliably increase prescriber enrollment without undue costs or extensive system modifications.²⁰³

No problems with inappropriate or fraudulent accounts have been reported since Massachusetts dropped its notarization requirement for prescriber enrollment into the PDMP.²⁰⁴ No other significant barriers were encountered in adopting automatic enrollment.

Process and outcomes measures

Prior to mandating prescriber enrollment and use of its PDMP, Massachusetts had low prescriber registration. During the first quarter of 2011, 1 percent of prescribers who had written one or more Schedule II-IV controlled substance prescriptions were enrolled in the PDMP. This share grew to just 2 percent by the middle of 2012.²⁰⁵ By the end of 2014, nearly 66 percent of providers in the state were enrolled.²⁰⁶ As of Sept. 30, 2015, that share had increased to 83 percent;²⁰⁷ and as of January 2016, more than 90 percent had enrolled.²⁰⁸

Prescriber PDMP queries totaled 44,965 in the third quarter of 2012. In the fourth quarter of 2014, two years after the start of automatic enrollment, queries totaled 166,007, a 269 percent increase.²⁰⁹ Streamlined enrollment occurred just before prescriber utilization increased, though it may not have been the sole cause of this growth.



Educational and promotional initiatives

Since states began providing PDMP data to prescribers to help make clinical decisions about controlled substances (Nevada was the first, in 1997),²¹⁰ it has been essential to educate providers about how PDMPs work. Prescribers need to know what a PDMP is, how it will assist in making clinical decisions, how to register for a PDMP account, and how to request and use a patient's controlled substance prescription history report.

When major PDMP program changes are made, including a state's enactment of laws mandating that prescribers use the PDMP, there is a high degree of need for PDMPs to launch educational initiatives.

Evidence of effectiveness

While prescriber education has been widespread in the PDMP community for two decades, these efforts have not been evaluated because PDMP leaders have focused on establishing and maintaining IT systems capable of collecting the massive quantities of prescription data, processing it into operational databases, and producing reports that prescribers and other users can utilize.

Information on the numbers of prescribers attending training programs is collected by the Bureau of Justice Assistance Performance Measures for states receiving Harold Rogers PDMP grants.²¹¹ For example, data combined from 10 grantee states indicated that the number of prescribers formally trained to use their PDMPs increased by 157 percent, from 1,738 during the first half of 2010 to 4,475 during first half of 2012. Likewise, 12 states reported that the number of prescribers informally trained (this can include educational materials sent by mail or email, presented at conferences, or downloaded from the PDMP website) increased by 157 percent from 11,067 to 28,413 during the same period. Individual states may also maintain records of educational programs provided and numbers of participants.

The ultimate goal of prescriber educational programs is to provide prescribers the skills necessary to effectively utilize PDMP data in making clinical decisions that improve patient health and safety. Yet the gap between the training on PDMP use and individual clinical decisions is so great that thus far no studies have attempted to assign a connection.

Perspectives on implementation

State PDMP staff are constrained by daily program demands and limited resources but have generally understood the importance of educating prescribers around PDMP use and have developed programs for this purpose. These programs focus on educational and promotional activities as a way to promote awareness, registration, and use of the PDMP. The initiatives frequently include instruction on PDMP use, information about specific PDMP features, and recommendations that connect participants to related resources.

Current status of adoption

Thirteen PDMPs mandate prescriber training on the use of the PDMPs, and 40 programs provide education and outreach.²¹²

Case studies on educational and promotional initiatives

Maine uses surveys, other research to target educational initiatives

Maine's PDMP, which became operational in 2004,²¹³ provides extensive resources for prescribers on its website and uses surveys and evaluations to help guide educational and promotional efforts. The PDMP website provides basic information on how to use the PDMP, instructions on how to use unsolicited reports, recommendations for opioid prescribing, links to drug misuse screening tools, pain management resources, and resources for referring patients to substance use disorder treatment. The website also houses results from surveys and evaluations, including reports on prescribing trends and epidemiological analyses, which have been used to inform ongoing prescriber education. In July 2015, the PDMP published an informational brochure targeting clinicians.²¹⁴

Moreover, the Maine PDMP has partnered with “Search and Rescue,” a new federal prescriber education initiative that promotes prescriber use of the PDMP, among other activities to address prescription drug misuse. The initiative, which was developed by the Partnership for Drug-Free Kids with grant support from the Food and Drug Administration, is an online hub designed to help prescribers learn how to identify and manage prescription drug misuse in patients.²¹⁵ The initiative’s website includes a direct link to Maine’s PDMP resources, which describe approaches to talking with patients suspected of drug misuse, and links to the Substance Abuse and Mental Health Services Administration’s (SAMHSA’s) Behavioral Health Treatment Services Locator to assist prescribers in referring patients to substance use disorder treatment. The PDMP also contracted with the Maine Medical Association to provide continuing education training that promotes use of the PDMP to prescribers throughout the state.²¹⁶ In addition, some Healthy Maine Partnerships, which are community-based collaborations among state agencies and schools, hospitals, businesses, and volunteers, promote PDMP use by prescribers.²¹⁷

Outcomes from surveys and interviews have led academic and other researchers to recommend continued education and training to support prescriber use of the PDMP. A 2009 survey of prescribers and pharmacists was conducted after PDMP users were asked to re-enroll after the launch of a new web portal. Previously enrolled prescribers who had not re-enrolled to use the online portal were more likely than those who re-enrolled to cite training issues as a reason for not using the PDMP (16 percent vs. 4 percent; $p = .003$). A 2013 survey of registered PDMP users illuminated barriers to use: 40 percent forget their password, and 19 percent said the system was hard to use. While a majority of respondents (78 percent) reported finding the PDMP easy to use, the researchers recommended continued training opportunities, such as refresher courses that inform users about new features and training on strategies to incorporate PDMP use into office procedures.²¹⁸ Interviews conducted in 2014 with key prescribers, dispensers, state licensing boards, and other end users indicated that increased use of the PDMP requires education about PDMP availability as well as instruction on its use and effectiveness as a health care tool.²¹⁹ The study authors recommended that PDMP education efforts target individuals who are more likely to prescribe or dispense controlled substances (e.g., primary care providers and emergency room physicians); that these engagement efforts be ongoing and target enrollees who are potential opinion leaders among their colleagues; that continued training opportunities, such as refresher courses, be offered to inform users about new features; and that education address perceived barriers (e.g., lost passwords, strategies to address multiple provider episodes, strategies to incorporate PDMP use into office procedures).²²⁰

The PDMP staff is also collaborating with various organizations to hold prescriber training sessions and workshops throughout Maine on effective use of the PDMP in health care settings. This outreach is based on findings from a report that included input from state associations representing health care and substance abuse treatment providers, a health care provider, an overdose prevention specialist, and a staff member from the Maine Office of Substance Abuse, and 23 PDMP administrators and staff members responsible for promoting PDMP services for Healthy Maine Partnerships. Education-specific report recommendations included developing standardized educational materials for statewide distribution; identifying target audiences for this distribution; maintaining PDMP staff commitment to presenting at statewide professional association meetings; and working with pharmacists, dentists, health systems, and statewide associations to promote aspects of the PDMP specific to those groups.²²¹

Responding to suggestions from PDMP user groups, the Maine program began an initiative in 2015 to provide education in medical and pharmacy schools that promotes PDMP use when students enter their professions. In 2016, this effort is being amplified by an additional team member from the Maine Independent Clinical Information Services, which provides objective information on prescription drugs to prescribers.²²² This team

member will provide an overview of best practices in opioid prescribing, as well as reading materials for students.²²³

Outcomes and process measures

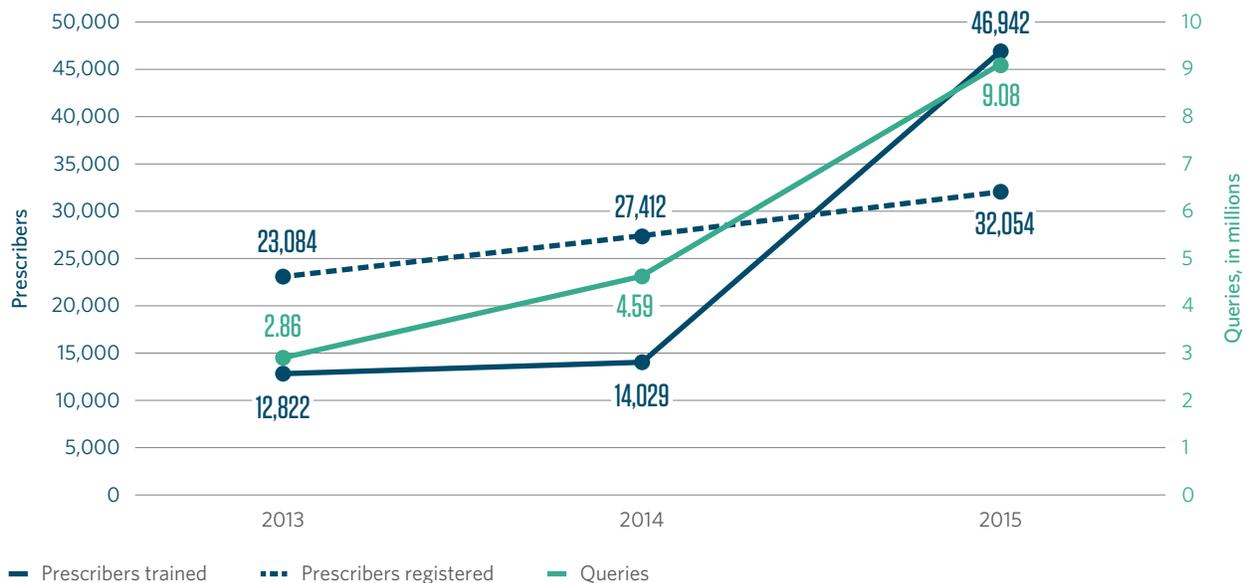
Because prescriber education efforts occurred in tandem with other PDMP enhancements, such as delegation and unsolicited reporting, it is not possible to measure the impact of these educational efforts alone on prescriber utilization and patient outcomes. Case studies on Maine’s use of delegation and unsolicited reporting provide additional details on these outcomes. (See pages 22 and 26.)

Florida uses prescriber outreach to increase enrollment and use

Florida’s PDMP made prescriber education and outreach a central, ongoing component of its activities since becoming operational in September 2011. Before the launch, prescribers were recruited to join the PDMP through the use of presentations to state medical groups that increased awareness, followed by hard copy invitations that were mailed by the PDMP vendor. Currently, PDMP staff, one of whom is a dedicated outreach coordinator, send email notifications and provide exhibits and presentations at meetings of professional organizations.²²⁴

Figure 11

Trained and Registered Prescribers Who Queried Florida’s PDMP, 2013-15



Source: Florida Health

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In 2015, a campaign was launched to inform prescribers of a redesign of the PDMP’s interface, providing an opportunity to leverage this outreach as a recruitment tool. Prescribers were also incentivized to learn about the PDMP through this topic’s inclusion in continuing medical education courses on the PDMP website referencing training materials and user guides. The PDMP staff is also collaborating with the Florida Medical Association to develop an online continuing medical education course for practitioners that will cover all aspects of the PDMP

including its objectives, funding sources, operations, user interfaces, and evidence of impact. Florida's medical groups, in an effort to avoid a state-imposed mandate that prescribers use the PDMP, are responsive to outreach efforts to encourage voluntary prescriber enrollment and utilization.²²⁵

Outreach to and education of prescribers, among other PDMP end users, have been an ongoing primary responsibility of the PDMP staff. Since 2009, funding included in grants from the Bureau of Justice Assistance's (BJA) Harold Rogers Prescription Drug Monitoring Program²²⁶ has provided support for outreach activities, including staff travel to medical association meetings. The PDMP, in partnership with the University of Florida, used funding from such a grant to conduct an assessment of the effects of PDMP staff communications and outreach.²²⁷

Staff members worked closely with the PDMP vendor to design and distribute educational materials and monitor conference schedules of all medical associations. Provider groups have participated as key stakeholders in helping to make prescriber education widely available through participation in curriculum development, newsletter announcements, and outreach to regional and county groups to encourage participation in education. No barriers to implementing prescriber education and outreach have been encountered.²²⁸

Process and outcomes measures

The PDMP staff in Florida trains tens of thousands of individuals to use the database each year. Between October 2013 and September 2015, the number of prescribers trained increased by 235 percent, from 14,029 individuals to 46,942.²²⁹

PDMP staffers have attributed increases in PDMP registration and use to their educational efforts.²³⁰ While prescriber enrollment increases have been minimal, use has nearly doubled in the past two years. As of Sept. 30, 2012, one year after the PDMP became operational, 14 percent of in-state prescribers who issued more than one controlled substance prescription were enrolled in the PDMP.²³¹ By September of 2015, 26 percent of such prescribers were enrolled.²³² Prescriber PDMP queries rose nearly 300 percent, from 1.15 million in 2012²³³ to 4.59 million in 2014. Within a year, this number nearly doubled, growing to 9.08 million. Of the top 200 prescribers, 84 percent (167) were enrolled in the PDMP as of 2015, and all but four had queried the database.²³⁴ An outreach campaign to increase enrollment and utilization by the state's top prescribers was planned for 2016, including the promotion of an online continuing education course with the Florida Medical Association.²³⁵ While educational efforts may not have been the only factor in increasing queries, these efforts plausibly supported an increase in PDMP utilization.

New York launches educational initiative for prescriber use mandate

The Bureau of Narcotic Enforcement within the state Department of Health, the agency administering the New York PDMP, provided dozens of educational forums throughout the state at meetings of state and local medical, nursing, dental, other prescriber gatherings and at hospital medical staff meetings. The bureau also made educational presentations to the Medicaid Drug Utilization Review Board, the Medical Liability Mutual Insurance Co.; professional licensing boards, Council on Graduate Medical Education, pain societies, and others.²³⁶ To reinforce the educational program, the next year the bureau conducted follow-up meetings to update prescribers and other stakeholders on what had occurred since the prescriber use mandate was implemented.

The bureau received assistance from the Medical Society of the State of New York, state medical specialty associations, state pharmacist organizations, New York State Dental Association, New York State Nurses Association, Healthcare Association of New York State, and other groups. Working through their professional

networks, these organizations arranged for invitations so the bureau could provide educational forums throughout the state. Educational programs, many of which provided continuing medical education, have included PowerPoint presentations with screen shots of PDMP webpages and hands-on learning to simulate signing on to the PDMP web portal to request and receive patient reports displaying mock data. Sessions also provided information about the nature and extent of the prescription opioid epidemic and details about the new state law, including exceptions to the mandate, rules for the use of delegates to request PDMP reports, provisions in the law for electronic prescribing, and the shift to daily prescription data reporting by pharmacies.²³⁷ Some presentations included pre- and post-education tests of knowledge.²³⁸ As a result, presenters tailored programs to the specific needs of participants and gauged where presentations needed to focus educational efforts.²³⁹

During the 2013 educational sessions, many participants expressed strong and vigorous disagreement with the new mandate. However, the bureau leadership used these sessions as a tool to increase prescriber buy-in, noting that the mandate was now a law and that the bureau's intent was to present the educational material so prescribers could fulfill their legal responsibilities. During the 2014 follow-up educational forums, the opposition expressed at previous presentations dissipated and attendees described the clinical value they had found by using PDMP data before prescriptions were issued, including data identifying patients at risk of drug abuse, overdose, and death.²⁴⁰

The educational program required extensive work by the PDMP staff. However, no additional funding was needed to cover staff time, because salaried leadership was willing to work extra hours throughout the period leading up to the August implementation and afterward.²⁴¹

Process and outcomes measures

During the year leading up to implementation of the new law, the bureau provided education to 1,900 prescribers and 1,400 pharmacists through this program. The bureau continued this program throughout 2014, providing follow-up education to 1,740 prescribers and 1,260 pharmacists. The case study on New York's prescriber use mandate describes prescriber utilization data trends and patient outcomes resulting from the new requirements. (See Page 15.)²⁴²

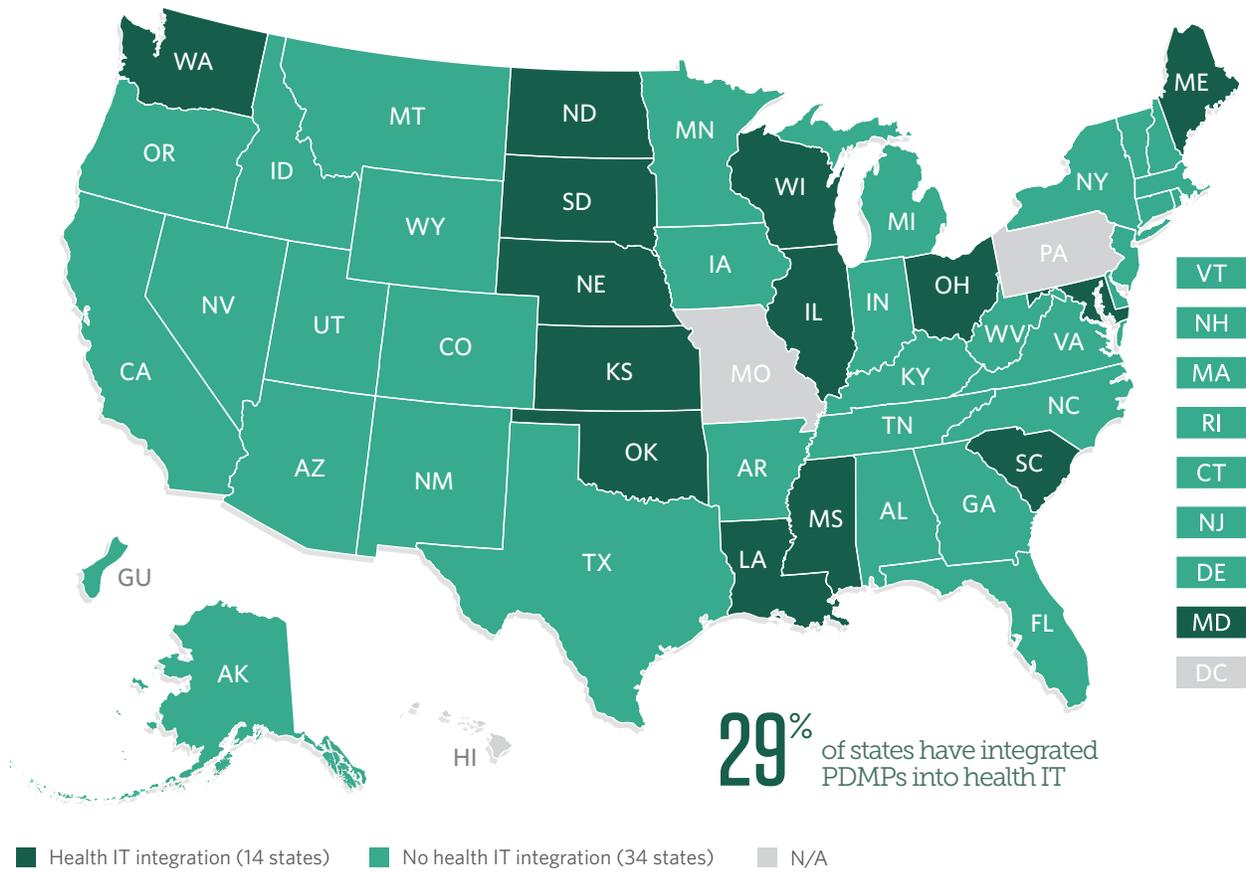


Health information technology integration

Integration of PDMPs with health information technology (health IT) is a new and developing practice with the potential to increase prescriber use of PDMP data. Such integration entails automatically querying PDMPs by electronic health record (EHR) systems, often via health information exchanges (HIEs), and linking patients' controlled substance prescription history data in PDMP reports with other patient information in the EHR. The goal of integrating PDMP data with EHRs and HIEs is to provide a more complete medical record through a single source to support clinical decision-making at the point of care.²⁴³ Integration with health IT makes PDMP data available to prescribers as part of their workflow without the need for multiple user accounts, logons, or user interfaces, thus saving prescribers time and effort.²⁴⁴ One study, involving focus groups of 35 prescribers from nine states, identified time spent accessing a report as a barrier to PDMP use and recommended integration with health IT as part of the solution.²⁴⁵

Figure 12

Programs That Have Integrated PDMPs Into Health IT



Note: For the purposes of this figure, health IT integration efforts may include access to PDMP data via a health information exchange, electronic health records, or both. Data reflects survey of 48 operational PDMPs. The District of Columbia, Hawaii, Missouri, and Pennsylvania are not included in this analysis. The District of Columbia PDMP was not operational when this survey was conducted. Hawaii officials did not respond to this survey. Missouri does not have authority to establish a PDMP. The Pennsylvania PDMP transitioned to the state Department of Health, and data for this measure was not available.

Source: Survey conducted by the Brandeis University PDMP Center of Excellence and The Pew Charitable Trusts from November to December 2015; see Appendix E

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Integration of PDMPs with health IT also has the potential to improve usability and accessibility of other PDMP functions, such as unsolicited reports or alerts²⁴⁶ and other clinical decision support tools.²⁴⁷ EHRs are already used to centralize medication management (e.g., intrafacility medication histories, drug formulary checks, e-prescribing), so it would be logical for these records to incorporate controlled substance prescription histories from PDMPs as well.

Evidence of effectiveness

Integration of PDMPs with health IT has largely been driven by the Enhancing Access to Prescription Drug Monitoring Programs Using Health Information Technology project, managed by the federal Office of the National Coordinator for Health Information Technology (ONC) in collaboration with SAMHSA, the Centers for Disease Control and Prevention, and the Office of National Drug Control Policy. Initially, to test the ease and effectiveness of improving access to PDMPs through health IT by ambulatory and emergency department prescribers, the project conducted six pilots in 2012 in five states: Indiana, Michigan, North Dakota, Ohio, and Washington.²⁴⁸ Additional pilots involving nine states were conducted in 2013.

The pilots demonstrated the successful automation of queries to PDMPs and integration of PDMP data with EHRs either directly (2012 and 2013 pilots) or via HIEs (2013 pilots).²⁴⁹ The pilots, although varied in their degree of integrating health IT, showed that as health care providers integrate PDMP data into their day-to-day workflows within health IT, such as electronic health records, users report the data as easier to access. Prescribers reported increased workflow satisfaction from having each patient's information as part of the medical record, rather than only for those patients for whom they decided to query the PDMP.²⁵⁰ For example, a pilot in Indiana included automatic queries to the PDMP that presented data in the patient's prescription history. Of 243 participating prescribers, 97 percent reported that PDMP data were now easier to access.²⁵¹

Perspectives on implementation

For PDMPs, the benefits of integration with health IT primarily involve potential increases to end-user satisfaction with, and use of, the PDMP. In addition, integration may have synergistic effects with other PDMP practices, such as increasing compliance with prescriber mandates by reducing the workload necessary for compliance.²⁵²

Some states are offering providers incentives to integrate health IT with PDMPs. For example, Washington obtained approval to include EHR integration with the PDMP as part of the federal Meaningful Use incentive program.²⁵³ In a different approach to incentives, in October 2015, Ohio's governor committed up to \$1.5 million per year to fund providers, pharmacies, and vendors for integrating the Ohio PDMP with EHRs and pharmacy systems.²⁵⁴

Barriers to integrating PDMPs with health IT include the need for resources to develop and test data systems as well as concerns about data security and patient confidentiality.²⁵⁵ For example, legal challenges needed to be addressed in ONC's Enhancing Access project in terms of data access rules; in some states, these included laws or policies prohibiting the storing of PDMP data directly in another system, such as an EHR.²⁵⁶ Rules and regulations can differ broadly by states.

Legal barriers also arose in the ONC project around how to manage the authentication of an end user querying the databases from different access points (i.e., the PDMP and EHR or HIE).

From a technology perspective, the ONC's Enhancing Access project faced design and interoperability barriers on each pilot that reflected typical issues associated with integrating legacy systems such as stand-alone PDMPs with new systems such as EHRs.²⁵⁷

Other legal and operational considerations for integrating PDMPs with health IT may include the need to have audit trails for individual end users; the need to have an individual, rather than an entity such as an emergency department, as the authorized end user; a lack of consensus on data transmission standards; competing priorities with Meaningful Use (the federal incentive program for EHR integration); and ongoing maintenance costs.²⁵⁸

Current status of adoption

Responses to the survey conducted for this report showed that as of 2015, 14 states were engaged in at least some form of health IT integration.²⁵⁹ Because health IT integration is a new and emerging PDMP practice, limited information exists on the status of state progress beyond the ONC pilots, which are well documented. Three expanded ONC Enhancing Access pilots focused on increasing the number of sites to test scalability, or the number of states supplying PDMP data. In addition, four new pilots tested new types of integration, including connecting through an HIE (rather than directly to an EHR), and how data can be sent in near real time to the PDMP from a pharmacy.²⁶⁰

In addition to the ONC project, SAMHSA funded two rounds of cooperative agreements with states to provide health care providers access to PDMP data through emergency department EHRs, primary care facility EHRs, and retail pharmacy dispensing systems. States are expected to integrate PDMP data into existing prescriber systems and clinical workflows with the goal of increasing utilization. Nine states received grants in 2012, and seven received grants in 2013.²⁶¹

The adoption of PDMP integration with health IT is tied to the adoption and interoperability of health IT in general, which, to date, remains low. Factors that inhibit uptake and interoperability of health IT include difficult-to-use technology, dissimilar proprietary systems and interfaces,²⁶² limited evidence for operational or financial benefits to practices,²⁶³ and end-user resistance to adoption.²⁶⁴

Case studies on health IT integration

Indiana advances health IT integration with a two-phase pilot

Indiana was one of the pilot sites for the federal Enhancing Access project, and its PDMP participated in a two-phase pilot that advanced integration efforts. The first phase, which took place for a month in 2012, integrated the PDMP with an Indiana hospital emergency department's EHR interface, CareWeb. The EHR interface automatically queried the PDMP upon patient check-in, passed the patient's demographic information to the PDMP, and received and saved the PDMP data as a PDF report within the patient's record. To access the PDMP report, a prescriber selected the link via CareWeb within the patient's record.²⁶⁵ The pilot leveraged Prescription Monitoring Program InterConnect (PMPi), an interstate data sharing hub, to serve as an intermediary for CareWeb access to the PDMP data.²⁶⁶ The second phase aimed to expand the availability of this integrated model across the state through an HIE and enhance prescriber interpretation of the data through the use of an analytics tool. (See Indiana enhanced user interface case study, Page 53.)

Because CareWeb is part of an older EHR system that used legacy technologies, PDMP staff members faced some additional complexities in integrating CareWeb with more modern systems.²⁶⁷ For example, the Indiana Board of Pharmacy had to approve policies to allow the CareWeb-linked EHR system, rather than allowing only authorized individual prescribers, to access the PDMP and store the PDMP data (as would be the case for an online PDMP portal).²⁶⁸

Process and outcomes measures

During the 2012 pilot, emergency department prescribers viewed 674 PDMP reports via CareWeb. The prescribers indicated that the integrated system was easier to use than the PDMP web portal and that the PDMP data provided information that was new to them. In 58 percent of responses, prescribers indicated that they reduced the number of prescriptions written or number of doses in each prescription in response to the PDMP

information; in 7 percent of responses, prescribers indicated that they increased the number of prescriptions written or number of doses provided. A federal analysis of the project found that the integrated system gave prescribers more confidence in their prescribing, facilitating access for patients who require controlled substances and making it less likely that patients would fraudulently obtain prescriptions.²⁶⁹

In a second pilot in 2013, the PDMP made data available to other hospitals through the Indiana Health Information Exchange, which resulted in 25,000 prescribers at 90 participating hospitals potentially having access to PDMP data through the HIE.²⁷⁰ During the second pilot, total queries to the Indiana PDMP increased 59 percent over the prior month.²⁷¹

The 2013 pilot also made data from Ohio and Michigan PDMPs available via PMPi and integrated NARxCHECK, an interface that accesses PDMP data and uses an algorithm to analyze the information and present it in a manner that facilitates prescriber use. The analysis considers factors such as numbers of prescribers and dispensers visited, drug dosages and overlapping prescriptions, and the number of active prescriptions to estimate a patient's risk score for opioid, sedative, and stimulant misuse. NARxCHECK generates a score ranging from 000 to 999. The first two digits of the score represent the composite percentile risk, and the third details the number of active prescriptions.²⁷²

Figure 13

Prescriber Reactions to Automated, Integrated PDMP and Electronic Health Record System in Indiana Pilot, 2012



Note: During the pilot, prescribers had the option of describing their response to the integrated data and did so 243 times.

Source: The MITRE Corp., Office of the National Coordinator for Health Information Technology and the Substance Abuse and Mental Health Services Administration

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Washington integrates PDMP data with the state health information exchange

The Washington PDMP is integrated with the statewide health information exchange, OneHealthPort, which allows health care organizations to exchange clinical information.²⁷³ If clinics and hospitals have a connection with the HIE, Washington prescribers can solicit PDMP information alongside other data in their EHRs without logging in to multiple systems.²⁷⁴ Additional integration allows threshold reporting through the Emergency Department Information Exchange (EDIE), a proprietary software platform that automatically queries the PDMP and provides data to emergency department prescribers via the HIE.

A 2014 report noted that of prescribers registered with the Drug Enforcement Administration to prescribe controlled substances, only 29 percent were also registered with the PDMP. A state interagency working group outlined two remedies to address the program's underutilization: seamless access to PDMP data through health IT integration and prescriber education. The working group estimated that the cost of health care and provider integration with the health information exchange would be \$45,750 to \$102,000, depending on the

extent of integration, such as whether the exchange includes a hospital emergency department, physician office, pharmacy, or some combination of those.²⁷⁵

A \$282,900 SAMHSA grant helped fund the integration between the PDMP and health information exchange,²⁷⁶ which was accomplished in November 2013.²⁷⁷ To achieve integration, staffers from the PDMP, OneHealthPort, and the database vendor developed transaction standards and protocols for the exchange of PDMP information with electronic health records. Key implementation challenges included how to track requests from individual users for auditing purposes, manage data sharing agreements with HIE participants, and respond to an automatic request for PDMP data via the HIE when a request needs to come from an authorized individual prescriber. Management of the PDMP data was retained by the Washington PDMP because OneHealthPort is an exchange model, meaning there is no central data repository.²⁷⁸

To track individual prescribers' requests, the PDMP username is included as part of the query, so that any HIE query is accounted for in the user's audit log. Instead of establishing data sharing agreements with each HIE subscriber, OneHealthPort added PDMP-specific language to its existing participant agreement, limiting access to Washington PDMP data to authorized, registered users of the PDMP (i.e., prescribers, dispensers, and authorized delegates). Automatic requests are sent via a medical director in order to meet statutory requirements that requests come from an authorized individual prescriber.²⁷⁹

The PDMP established a connection with the Emergency Department Information Exchange through the HIE in November 2014.²⁸⁰ EDIE also allows participating emergency departments to electronically exchange patient information, such as diagnoses and treatments, from previous visits.²⁸¹ Among other alerts, providers receive a PDMP report delivered to their electronic health record or, if they are not fully integrated with EDIE, by fax.²⁸² Automatic queries occur when patients are admitted to connected emergency departments, and reports are provided only if certain thresholds are reached based on a patient's controlled substance prescription history.²⁸³ The automated PDMP report includes the last 10 prescriptions, or a listing of controlled substance prescriptions for the past six months, whichever is greater.²⁸⁴

Process and outcomes measures

In 2015, EDIE was responsible for 2.1 million queries, more than all other system queries combined. Its queries come from only connected emergency departments, a number that has since grown. As of January 2016, 76 of 93 state emergency departments were connected.²⁸⁵

Figure 14

PDMP Queries in Washington, by Access Point, 2015



Source: Washington PDMP

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Enhanced user interfaces

In recent years, given the substantial amount of data and multiple therapeutic categories that may be contained in a single PDMP patient history report, some prescribers have inquired about developing interfaces that would facilitate data access and help users quickly analyze the most important information for clinical decision-making. This is an important point because patients' controlled substance history reports include listings of prescriptions issued to patients over a period of time, usually 12 months. Without any analysis of this data, prescribers have been left to read and interpret it themselves. In response, some PDMPs are exploring ways to make the data easier to use. For example, since December 2015, Kentucky calculates the MME of each opioid prescription and adds a daily MME dose level and a flag if a controlled substance prescription history exceeds a certain threshold²⁸⁶ set by a state medical advisory group.

Other examples of innovative interfaces include a dashboard, or a summary of analyzed information that appears when a prescriber opens an online account, or mobile applications allowing prescribers to access data whenever they need it from wherever they are.

Evidence of effectiveness

Because this practice is a recent development, evidence for effectiveness is limited. Among the case study states, data on prescriber utilization will be collected going forward by California and New Jersey, which anticipate making this information available to other states. Prescriber utilization data from Indiana's test initiative is described below, along with early information from New Jersey. Improved PDMP interfaces are anticipated to help prescribers use PDMP data more easily and assist them in understanding the critical patient care issues the data identify. These modifications may permit prescribers to improve their clinical decision-making so patient health and safety are better protected.

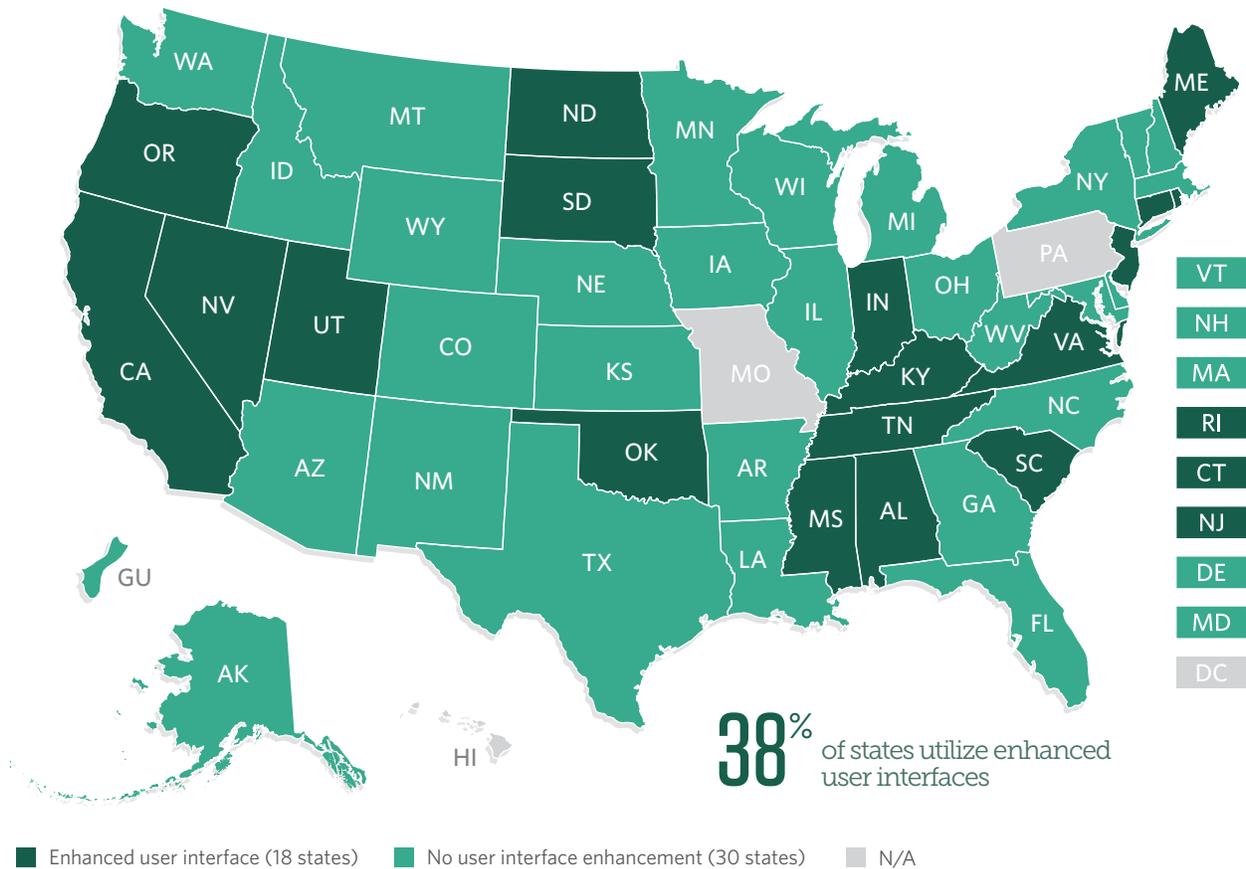
Perspectives on implementation

Adoption of enhanced user interfaces requires considerable time and resources, and their implementation may be constrained by budgetary limitations. However, enhanced user interfaces can provide value by alerting prescribers to potential high-risk patients and may increase prescriber utilization of the PDMP, as was the case in Indiana. The interfaces described in this section are being pilot tested; if successful, these refined and implemented interfaces will serve as models for other states.

Current status of adoption

Eighteen states report having an enhanced user interface of some type.²⁸⁷ Several states have discussed the possibility of developing dashboards for PDMP reports. So far, one commercial product, the NARxCHECK system for patients' controlled substance prescription histories, is operational.

Figure 15
 PDMP Adoption of Enhanced User Interfaces



Note: Enhanced user interfaces include risk assessment tools, dashboards, data summaries, and red flags. Data reflects survey of 48 operational PDMPs. The District of Columbia, Hawaii, Missouri, and Pennsylvania are not included in this analysis. The District of Columbia PDMP was not operational as of December 2015. Hawaii officials did not respond to this survey. Missouri does not have authority to establish a PDMP. The Pennsylvania PDMP transitioned to the state Department of Health, and data for this measure was unavailable.

Source: Survey conducted by the Brandeis University PDMP Center of Excellence and The Pew Charitable Trusts from November to December 2015; see Appendix E

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Case studies on enhanced user interfaces

New Jersey develops first PDMP mobile device application

Recognizing the need to provide prescribers access to the PDMP whenever and wherever patient care is delivered, the New Jersey PDMP staff developed a mobile phone application that prescribers and all PDMP users²⁸⁸ can use to request and obtain PDMP reports. The application was launched in 2015, and its development reflects the widespread adoption of clinical apps in many fields.

The New Jersey design team examined applications used in health care and in other fields, taking advantage of the wide spectrum of solutions already in use. This work allowed the team to adopt security features utilized in

banking and other fields. Overall, the PDMP staff found that app design for the functionality needed to provide access to PDMP information was easy.

The mobile phone app was designed to be independent of other companies' IT infrastructure and to operate even if the PDMP web portal is temporarily unavailable. This design decision was driven by fallout from Superstorm Sandy, which knocked out almost all forms of communication in the state in 2012. Following the storm, mobile phone infrastructure was restored more rapidly than other services.

Because the format of the app screen mirrors the information available on the PDMP web portal, it was not necessary to develop new training modules for users.²⁸⁹ Prescribers can view controlled substance prescription histories for their patients and access user profiles. In addition, the app has a notification function that can be used by the PDMP staff to send push notifications or alerts to all PDMP users. These notifications could be used to communicate critical information, such as when a counterfeit prescription operation has been discovered. The app also expedites contact with the PDMP staff as prescribers can tap a button that will automatically call the PDMP office. Security features have been built into the design, including a formal sign-out users can click on to disconnect their mobile device from the app.

New Jersey PDMP staff members overcame two hurdles in developing the app. First, it took several weeks to obtain approval from the owners of Android, Apple, and Windows platforms prior to posting the application in an app store. The platform administrators were helpful in facilitating the process and overcoming regulatory hurdles. The New Jersey PDMP had to certify that it is a government system with the rights to access and distribute the information; the PDMP operates under separate statutory authority and did not neatly fit within other health care apps, which must abide by the patient privacy protections in the Health Insurance Portability and Accountability Act. Therefore, multiple discussions were necessary to resolve this issue. Second, state employees did not have access to multiple types of phones to conduct a beta test of the system. This was resolved by turning to professional health care licensing board members willing to use their phones to test the app.²⁹⁰

Initial development and deployment costs of \$95,000 were covered by a 2013 Bureau of Justice Assistance grant. Minor system maintenance and upgrades are required (these costs are incorporated in the vendor contract for the New Jersey PDMP; they are not broken out).²⁹¹ New Jersey is considering additional mobile apps for tablets.

Process and outcomes measures

As of Nov. 6, 2015, without a significant outreach effort, 545 users had downloaded the app. The PDMP team expects to promote the app during its next round of outreach, which was planned for 2016.²⁹²

While total PDMP requests number about 180,000 per month, requests for reports through the mobile app are not distinctly recorded.²⁹³

Demands on technological staff or consultants, and the funding needed to cover this additional activity, drive PDMP impact. A commitment from agency management is required to identify the resources needed and to permit the PDMP staff to either develop the app in-house or obtain help through external contracting. New Jersey found that multiple firms and personnel have experience in this type of app design and operation and can help the PDMP.

Indiana explores PDMP analytics through a federally funded pilot project

The Indiana PDMP piloted a health care facility process in which prescribers obtained results of the PDMP query in a modified format that augments the standard report by using data analysis to provide a composite patient

risk score. The Indiana PDMP staff used NARxCHECK for this purpose. The product also contains information on MME; lists the patient’s prescriptions, providers, and pharmacies; and generates a graphical analysis of the patient’s controlled substance prescription history to show overlapping prescriptions.²⁹⁴

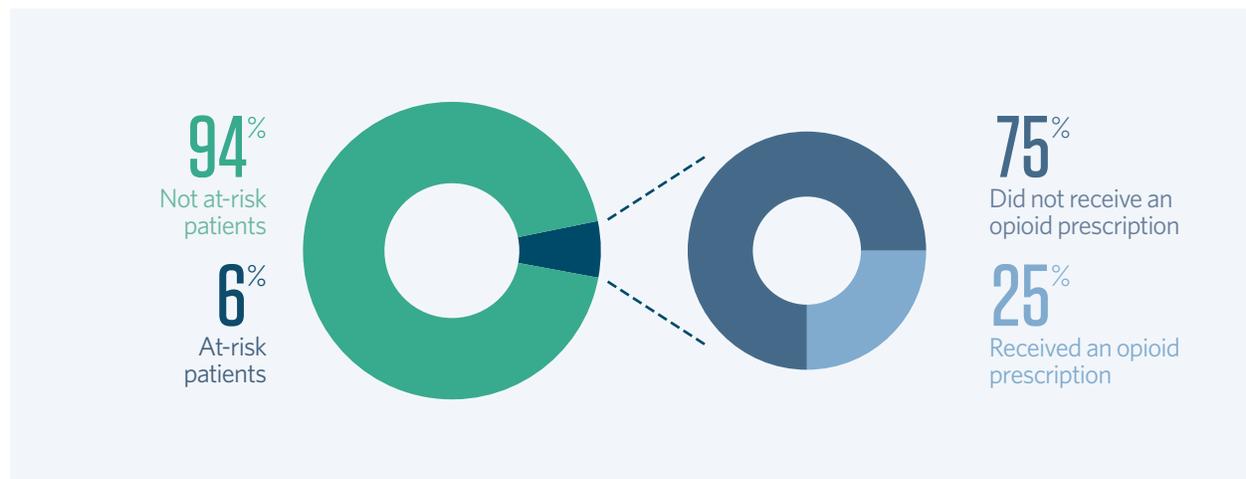
The Indiana PDMP pilot was part of the two-phase federal initiative Enhancing Access, which was initiated to demonstrate interoperability between PDMPs, EHRs, and other IT systems used by health care providers. The 2012 pilot, described in the Indiana health IT case study (see Page 48), integrated the PDMP with Wishard Memorial Hospital’s emergency department information management system, CareWeb.²⁹⁵ The second multifaceted 2013 pilot phase, which included three additional larger hospitals, continued automatic query of the PDMP, which routes through PMPi. For admissions to Wishard Hospital, NARxCHECK, which runs on PMPi, analyzed the data and returned the NARxCHECK and PDMP information report via CareWeb.²⁹⁶ The pilot established a connection with the Indiana Health Information Exchange to make the PDMP data available to all hospitals across the state connected to the health information exchange.

Process and outcomes measures

Overall, the number of prescribers using the PDMP increased by 80 percent, and total queries increased statewide by 63 percent, between Jan. 23 and Feb. 22, 2013. During the monthlong pilot phase, 4,259 PDMP/NARxCHECK reports were generated. Some 246 individuals, or 6 percent of patients, seen at the Wishard emergency department during that period were at risk, meaning they had a NARxCHECK score of 500 or greater. In 72 instances, prescribers also accessed the PDMP report to more carefully review the patients’ drug history. Of the at-risk patients, 75 percent did not receive an opioid prescription.²⁹⁷

Figure 16

Patients Identified as ‘At Risk’ in 2013 Indiana Enhanced Interface Pilot



Note: Patients were characterized as “at-risk” if they had a NARxCHECK score of 500 or greater.

Source: The MITRE Corp., Office of the National Coordinator for Health Information Technology and the Substance Abuse and Mental Health Services Administration

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California develops high-risk alert dashboard

California has redesigned its PDMP to help prescribers improve clinical decision-making when considering whether to provide a controlled substance prescription. A significant component of the redesign is a high-risk alert dashboard²⁹⁸ that will proactively communicate information to prescribers about patients who may be engaged in the high-risk use of controlled substances. The California Department of Justice, which houses the PDMP, devoted extensive time and staff effort to the redesign.

A key challenge for this project was budgetary. PDMP staff members began the redesign process after the state's PDMP budget had been virtually eliminated.²⁹⁹ Therefore, PDMP staff needed to engage in extensive efforts to develop the documents explaining how the new system will work, how it will improve operations, and how it will resolve the concerns of users, such as improving response times. This was necessary so that the attorney general, whose office oversees the PDMP, and the governor would understand the rationale for securing funds to complete the redesign and provide an ongoing budget to support the new system following implementation. The governor, attorney general, and legislature entered into extensive negotiations, resulting in combined executive action and legislative appropriations through which unspent funds were assigned to rebuild the entire PDMP, which cost \$3.9 million. In addition, healthcare professional licensing fees were raised \$6 per year per licensee to provide the \$1.8 million annual operational expenses.³⁰⁰

Once funding was secured, PDMP staff engaged with professional IT system developers as they designed the algorithms and other processes that support the prescriber dashboard.

With the redesigned PDMP activated in early 2016,³⁰¹ each prescriber sees critical information on the account dashboard when logging in to the PDMP, including a list of patients who are prescribed more than 100 MME per day; have obtained prescriptions from six or more prescribers, or six or more pharmacies, during the past 12 months; are prescribed more than 40 milligrams of methadone daily; have been prescribed opioids for more than 90 consecutive days; or are concurrently prescribed benzodiazepines and opioids.³⁰²

Clicking on each patient's name brings up the individual's controlled substance prescription history, including spelling variations of the name that have been linked together, such as Robert Smith, Bob Smith, and Robbie Smith.³⁰³

The prescriber accounts also allow users to flag patients with whom they have pain management agreements so that this information is communicated to other providers. This provides a mechanism to avoid additional prescribing to these patients that could be potentially counterproductive or in violation of their agreements.

The redesigned PDMP also features a peer-to-peer communication function so that prescribers and dispensers can send each other messages about patients of mutual concern. Prescribers receive patient safety alerts and daily messages with information regarding patients who reach various prescribing thresholds.

The state plans to establish an advisory group of physicians who are experts in substance use disorder treatment and pain management, as well as conditions treated by controlled substances. These experts will assess prescriber use of the dashboard alerts and recommend modifications to assure maximum effectiveness. By engaging physicians in the development and ongoing review of the new dashboard, the PDMP has made effective use of this expertise and taken steps to gain buy-in from prescribers and other stakeholder groups.

Process and outcomes measures

The redesigned PDMP was launched in early 2016, so outcomes information is not yet available. The PDMP will maintain records that can be used to evaluate prescriber utilization of the new dashboard and of changes in prescribing by drug, type of prescriber, geographical region, and the other categories, including the 43 prescription behavior measures provided by the Prescription Behavior Surveillance System, of which California is a participating state.³⁰⁴ The PDMP received a Harold Rogers PDMP Practitioner and Research Partnerships grant from the Bureau of Justice Assistance; these grants are provided to examine the impact of PDMP policies and procedures on patient and community-level outcomes.³⁰⁵

Synergistic and Emerging Practices

Practices intended to optimize a PDMP, including those aimed at increasing prescriber utilization, are usually adopted in the context of other PDMP practices, either existing or in the process of implementation. Depending on the practice, it may help to augment the effectiveness of one or more others, that is, have a synergistic effect in producing desired outcomes. Given national interest in mandates, these offer an example of synergies that are achieved when combined with other strategies covered in this report. Practices that may drive greater prescriber and pharmacist use of PDMPs, besides the eight that are the primary focus of this report, will also be described.

Practices that are synergistic with mandates

Evidence indicates that prescriber mandates produce an immediate and sizable increase in utilization. However, a requirement to use a PDMP may not necessarily result in every prescriber accessing the database or making good use of the information. In principle, prescribers could be penalized for noncompliance, and mandates often include such penalties. (See Appendix D.) One approach to addressing noncompliance is for states to audit prescriber use of the PDMP to see if controlled substance prescriptions are preceded by PDMP queries, according to mandate requirements. A complementary approach is for states to facilitate and incentivize prescribers to access PDMP data and use it in clinical decision-making. The adoption of many of the practices described in the main body of this report can augment outcomes from prescriber requirements to use the PDMP, thus facilitating a mandate's implementation and increasing the database's effectiveness. In addition, these practices will likely have synergistic effects with each other.

When introduced in conjunction with a mandate, streamlined enrollment can significantly increase the rate of enrollment, and, therefore, support subsequent increases in utilization. States contemplating a mandate might also consider implementing delegate accounts. Prescribers can more easily comply with the mandate by assigning delegates the responsibility for retrieving reports. Integration of PDMP data into health information systems can also facilitate compliance with a prescriber mandate by greatly simplifying access to this information. Eliminating the need to log in to a separate database and/or have a patient's controlled substance prescription history automatically appear in the health record can increase the likelihood that the history will be consulted in clinical decision-making.³⁰⁶

The effectiveness of mandates in promoting prescriber use of PDMPs can be amplified by increasing the timeliness of data. For the prescriber, this helps to reinforce the advisability of viewing PDMP data in advance of prescribing medications that a patient might be misusing or diverting and should help motivate voluntary use of the PDMP as a valuable contribution to a practice. Finally, enhanced user interfaces that supply easily

understandable and actionable prescription data work as a strong inducement for prescribers to make use of it. As with more timely PDMP data, this capability to make a quick assessment will likely incentivize the regular use of PDMP data, increasing compliance with the mandate to use it when making clinical judgments.

Additional and emerging practices

Besides the eight practices highlighted in this report, other practices and policies show promise:

Prescriber self-lookup: A majority of PDMPs (44) provide prescribers the ability to look up their own prescribing history in the database.³⁰⁷ Because prescriber DEA registration numbers or prescription pads are sometimes stolen, fraudulent prescriptions may be written and filled under a prescriber's name. Self-lookup helps prescribers verify that all prescriptions recorded with their DEA number are legitimate. Providers can also track the frequency and quantity of their prescribing when evaluating their practices. Such features (i.e., ones that go beyond patient queries) can help to incentivize prescriber use of the PDMP.

Prescriber report cards: As part of efforts to increase prescriber utilization of its PDMP and reduce the over-prescribing of opioids, Arizona has pioneered the use of prescriber report cards.³⁰⁸ These present aggregate PDMP data in a graphical format, showing how a practitioner's prescribing compares to norms for peers in the same specialty and geographical location. The four counties that took part in piloting these report cards, which were sent quarterly, had greater increases in prescriber PDMP enrollment than the state as a whole. In Pinal County, prescriber utilization increased 14 percent during the program's first year and the number of controlled substance prescriptions fell more than 5 percent, while the proportion of prescribers who were outliers in total dosage units compared with their peer group dropped by 26 percent.³⁰⁹ Jackson County, Oregon, is also providing practitioners with peer group prescribing data using online dashboards.³¹⁰

Batch reporting: So-called batch reporting allows a prescriber or delegate to enter multiple patient names in a query and retrieve all their controlled substance prescription histories simultaneously. This is useful when preparing for the next day's patient visits, minimizing the time and effort spent acquiring each patient's PDMP report. Reports can be reviewed in advance to see which, if any, might suggest problematic use of controlled substances. Such efficiency can help incentivize use of the system. Massachusetts is an example of a state that has recently implemented batch reporting as a feature of its PDMP,³¹¹ and New York provides for delegates to request up to 30 patient profiles per request.³¹²

Coalition-driven efforts to increase prescriber utilization: Community coalitions, making use of PDMP data, can help drive increased use of PDMPs. Project Lazarus, a North Carolina drug misuse prevention effort, mobilized Wilkes County residents to request that local practitioners take steps to improve prescribing, including greater use of the PDMP. The PDMP assisted the project in this effort by providing data on how often prescribers in the county were accessing the system. Since access rates were relatively low, this allowed room for improvement as requested by the coalition. Rates of prescriber utilization increased in response to the request, and in combination with other Project Lazarus initiatives, patient outcomes related to prescription drug misuse improved.³¹³ As part of a prevention effort in Franklin County, Massachusetts, the Opioid Education and Awareness Task Force has campaigned to have prescribers sign a Safe Prescriber Pledge. Signatories agree, among other things, to "Make proactive use of the Massachusetts Prescription Monitoring Program (PMP)."

Utilization by dispensers: State steps to encourage greater use of PDMP data by pharmacists are similar to those aimed at prescribers. Because pharmacists and other dispensers are charged with making medically informed judgments about whether to release controlled substances to customers, access to PDMP data can help inform these judgments.

- **Dispenser mandates:** Twenty PDMPs require pharmacists to enroll in the PDMP, while 11 require them to access this information under certain conditions.³¹⁴ However, as is the case with weaker prescriber mandates, these conditions are either advisory, relying on a pharmacist’s judgment, or they cover only certain controlled substances. For example, the Delaware statute says that a dispenser must obtain a PDMP report “when a dispenser has a reasonable belief that a patient may be seeking a controlled substance listed in Schedule II, III, IV or V for any reason other than the treatment of an existing medical condition.” In no state are pharmacists required to consult the database before dispensing all opioid prescriptions. However, in Massachusetts, pharmacists must check the PDMP only when dispensing hydrocodone-only extended release products not in an abuse-deterrent form.³¹⁵ Some pharmacy chains, such as those in Oregon, now require their employees to enroll in the PDMP and check it under certain circumstances; pharmacist registration in and use of Oregon’s PDMP rose rapidly in 2013 in response to these requirements.³¹⁶ This indicates that dispenser mandates can be feasible and effective. It also suggests that legislative requirements that pharmacists check the PDMP might find support among pharmacy organizations.
- **Other practices to encourage dispenser utilization:** In 12 states, pharmacists are required to attend trainings in the use of its PDMP, and 18 states are engaged in sending unsolicited PDMP reports to pharmacists on patients who meet risk criteria such as exceeding a multiple provider episode threshold.³¹⁷ Integrating PDMP data into pharmacy dispensing systems, especially in summary formats that allow quick assessment of a patient’s controlled substance prescription history, will also facilitate and incentivize pharmacist use of PDMP data. One pharmacy chain in Ohio (Kroger) has done so statewide since July 2015, using the NARxCHECK system.³¹⁸
- **Barriers:** There is a clear opportunity, and arguably a need, for increasing PDMP use by pharmacists. Implementing routine PDMP data use in pharmacies often involves a time commitment on the part of the pharmacist (e.g., attending a training session, querying the database, assessing PDMP information), the cost and disruption of upgrading pharmacy information systems, and reconfiguring the pharmacy workflow to incorporate regular PDMP queries, all of which may slow down the dispensing process. However, that some pharmacy chains now require such use indicates that implementation is feasible. Applying improvements in information technology to pharmacy dispensing systems will likely facilitate greater adoption, as will collaborative approaches to implementing practices, such as mandates, that take industry concerns into account.

Recommendations for advancing emerging practices

Research is needed to evaluate the effectiveness of these practices in driving greater prescriber and pharmacist utilization of PDMPs. Prescriber report cards, in particular, have not been widely implemented, and different approaches to the practice are likely to yield varying levels of effectiveness. The opportunity therefore exists to assess the early versions of this practice in order to inform later implementations. Cross-site evaluations can compare approaches to help determine which report card formats, contents, and delivery cycles work best, and in what sorts of state and policy environments. Similarly, evaluations of coalition efforts to induce greater PDMP utilization, which are now getting underway in some states, can help determine what sorts of interventions are the most effective.

Research on the impact of pharmacist use of PDMPs on medically inappropriate or fraudulent dispensing, and associated health outcomes, is needed to demonstrate the benefits of such use. The specific conditions that should trigger pharmacist queries to the PDMP and the best systems and practices to support data access need to be identified. Any evidence that pharmacist queries to the PDMP result in reduced costs to pharmacies, and enhance public perception of pharmacies as civic-minded, will help to motivate industry adoption of practices aimed at increasing dispenser utilization. Because dispenser mandates are thus far relatively rare, the opportunity exists to evaluate early adopters of mandates and other policies to identify best practices in optimizing dispenser use of PDMP data.

Conclusion

Prescriber use of PDMP data can help enhance patient care and reduce negative health outcomes associated with the medically unnecessary use of controlled substances. State adoption of evidence-based PDMP practices that increase prescriber utilization can aid broader efforts to reduce overdoses and deaths. States can prioritize the implementation of these practices based on the assessment of PDMP operations and policies, available resources, expected impact of implementation, and effort needed to overcome barriers to their adoption. State-specific examples described in this report provide precedents and experience for other programs to draw upon.

Of the eight practices, evidence shows that prescriber use mandates are the single most efficient means for increasing prescriber utilization. However, mandating database queries does not guarantee that prescribers will make effective use of PDMP data in their prescribing decisions. Determining the optimum conditions, such as the timing triggers for required checks and exemptions, will require continued monitoring and comparison of outcomes among the states that have adopted them.

Importantly, having a prescriber use mandate does not preclude other opportunities for PDMP improvement. Delegation, unsolicited reporting, daily PDMP updates, streamlined enrollment, educational and promotional initiatives, health IT integration, and enhanced user interfaces present a menu of options for removing barriers to prescriber use and ensuring that the data are used effectively to inform clinical decision-making. If adopted, whether in the absence of or in tandem with a mandate, these practices will increase the chances that prescribers will learn about the PDMP, enroll in the program, access the data voluntarily or be prompted to access it, and use it consistently in clinical practice. State officials should explore what works best for their program and develop an approach that focuses on making PDMP data easier to access and understand.

Appendix A: Prescriber Enrollment and Use of PDMPs by Program

	DEA-registered prescribers as of December 2014	Percentage of DEA-registered prescribers enrolled in the PDMP as of December 2014	Prescriber/delegate queries per DEA-registered prescriber in 2014*	Prescriber/delegate queries per enrolled prescriber in 2014†
Alabama	15,852	N/A	17.1	N/A
Alaska	4,474	20.6	10.1	48.9
Arizona	29,867	27.3	84.4	309
Arkansas	10,525	29.8	45.4	152.2
California	171,062	4.8	9.6	198.4
Colorado	26,832	N/A	N/A	N/A
Connecticut	22,027	13.6	9.1	66.7
Delaware	4,948	123.7 [§]	90.4 [§]	73.1 [§]
District of Columbia	8,186	N/A	N/A	N/A
Florida	69,728	20.9	27.9	133.7
Georgia	36,278	N/A	N/A	N/A
Guam	268	0.7	0	0
Hawaii	6,635	N/A	N/A	N/A
Idaho	7,505	39.9	39.3	98.7
Illinois	55,850	32.1	9.7	30.1
Indiana	26,602	47.4	61.7	130.2
Iowa	14,480	35.5	11.8	33.2
Kansas	14,240	32.2	15.2	47.2
Kentucky	17,996	86.3	223.8	259.3
Louisiana	17,949	31.1	54	173.9
Maine	7,699	82.4	36.6	44.4
Maryland	33,392	15.4	8.6	55.9
Massachusetts	44,297	55.3	10.2	18.4
Michigan	44,202	64	72.4	113.1
Minnesota	28,553	31.7	16.3	51.3
Mississippi	10,680	91.1 [‡]	73.1	80.2
Missouri	23,484	N/A	N/A	N/A
Montana	5,266	31.1	N/A	N/A
Nebraska	9,803	14.4	2.5	17.3
Nevada	10,517	N/A	N/A	N/A
New Hampshire	7,947	N/A	N/A	N/A
New Jersey	45,252	67.8	31	45.8

Continued on next page

	DEA-registered prescribers as of December 2014	Percentage of DEA-registered prescribers enrolled in the PDMP as of December 2014	Prescriber/delegate queries per DEA-registered prescriber in 2014*	Prescriber/delegate queries per enrolled prescriber in 2014†
New Mexico	9,972	56.3	37.6	66.8
New York	110,411	98.4 [§]	152.3 [§]	154.7 [§]
North Carolina	43,512	54.3 [‡]	59.2 [‡]	109.1 [‡]
North Dakota	3,864	48.6	13.2	27.2
Ohio	50,305	51.4	23.5	45.7
Oklahoma	15,801	N/A	105.9	N/A
Oregon	20,622	29.7	20.1	67.7
Pennsylvania	64,778	N/A	N/A	N/A
Rhode Island	6,091	44 ^{††}	N/A	N/A
South Carolina	19,560	22.6 [‡]	17.6 [‡]	77.8 [‡]
South Dakota	4,420	21.7	6.5	29.8
Tennessee	31,228	84.9	104.2	122.7
Texas	96,617	16.9	9.1	53.7
Utah	12,588	N/A	N/A	N/A
Vermont	3,778	N/A	N/A	N/A
Virginia	39,841	41.7	27.7	66.5
Washington	38,596	30.1	8.3	27.7
West Virginia	8,444	37	51.9	140.5
Wisconsin	29,226	18.3	7.8 ^{**}	42.4 ^{**}
Wyoming	2,767	24.9	18	72.2

* This is a measure of utilization based on all in-state prescribers who have DEA registrations authorizing them to prescribe controlled substances. All of them are potential users of the PDMP. The measure therefore enables comparisons between states regarding utilization by the controlled substance prescriber community in general; however, numbers may, in part, reflect differing levels of PDMP enrollment between states.

† This is a measure of utilization based on enrolled in-state prescribers only. The measure enables comparisons between states with different levels of PDMP enrollment; however, numbers do not provide information on the extent to which the PDMPs are used by the controlled substance prescriber community in general.

‡ Data include in-state and out-of-state prescribers.

§ Data include non-DEA-registered practitioners.

** Data do not include prescriber delegate queries.

†† Data represent percentage of active state controlled substance registrations.

Source: Drug Enforcement Administration, Office of Diversion Control, "Registrant Population by State and Business Activity," accessed Dec. 16, 2015, <https://apps.deadiversion.usdoj.gov/webforms/jsp/odrReports/odrStateReport.jsp>; survey conducted by Brandeis University PDMP Center of Excellence and The Pew Charitable Trusts from November to December 2015

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Appendix B: PDMP Planning Tool

Overview

In 2014, approximately 19,000 people in the United States died from overdoses of prescription opioids. Prescription drug monitoring programs (PDMPs) are a key resource for individual prescribers and public health and safety agencies responsible for addressing the prescription opioid epidemic. PDMP data help prescribers detect potentially inappropriate use of controlled substances, make better-informed clinical decisions, and improve patient care.

The purpose of this planning tool is to assist states and territories in prioritizing the adoption or enhancement of practices to increase prescriber utilization of PDMPs and then facilitate planning to support the implementation of the selected practice(s). Table B.1 provides a description of evidence-based PDMP practices.

Table B.1

Evidence-Based PDMP Practices to Increase Prescriber Utilization

PDMP practices	Description
Prescriber use mandates	Requiring a prescriber to view a patient's PDMP data under certain circumstances, such as before writing an initial prescription for a controlled substance.
Delegation	Allowing prescribers to designate someone on staff, such as a nurse, to access the PDMP on their behalf to help manage workflow.
Unsolicited reports	Proactively sending communications from PDMP staff to prescribers, dispensers, law enforcement, and regulators to flag potentially harmful drug use or prescribing activity based on PDMP data.
Data timeliness	Uploading of information to the database at set intervals, whether in real time, daily, weekly, or monthly. (Dispensers, which include pharmacies and prescribers who provide medications directly to patients, are responsible for uploading data.)
Streamlined enrollment	Simplifying processes, such as instituting automatic PDMP registration triggered by state controlled substance registration, to more easily enable prescribers to enroll in the PDMP.
Educational and promotional initiatives	Making efforts to promote the program, including prescriber training (via formats that include online videos and instructional materials) on how to access and use PDMP data
Health information technology (IT) integration	Combining PDMP data with other clinical data through technologies that are used to store, communicate, and analyze health information, such as electronic health records.
Enhanced user interfaces	Implementing user-friendly technologies, such as dashboards and mobile applications that provide PDMP data in easily understandable formats.
Other practice(s)	Optimizing a PDMP, including those aimed at increasing prescriber utilization. Examples include prescriber self-lookup, prescriber report cards, and batch reporting to increase prescriber utilization.

Figure B.1

Steps to Support the Development of a Strategic Plan

1

Assess your current situation and desired goals

Which PDMP practices are already in place?

What goals do you have for each PDMP practice?

2

Identify and categorize stakeholders

Who has a stake in the implementation of each PDMP practice?

How would you characterize each stakeholder?

3

Analyze the facilitators and barriers to implementing each PDMP practice

What factors will help in achieving your goals?

What roadblocks do you expect to encounter?

4

Prioritize your goals

Which goals will have the greatest impact?

Which goals can be more easily accomplished?

5

Develop a strategic plan

When do you plan to accomplish your goals?

Who will be responsible for action steps?

How will you define success?

6

Plan for sustainability

Which activities can and should continue?

Which activities are most likely to support your short- and long-term goals?

How to use this tool

This tool will walk users through the process of developing a strategic plan by helping to define goals, stakeholders, facilitators and barriers, and priorities. (See Figure B.1.) States and territories may choose to adopt or enhance one or more PDMP practices to improve prescriber utilization.

Assess your current situation and desired goals

Complete Worksheet 1 to gain a deeper understanding of the current status of PDMP practices and desired goals for the future. Review the PDMP laws, regulations, and operations in place to determine if and how each practice could be implemented or enhanced. Goals that fall outside the scope of the eight evidence-based PDMP practices outlined in Table B.1 should be placed in the “Other practice(s)” category. These might include prescriber self-lookup, prescriber report cards, or batch reporting. Consider the nuances of each PDMP practice and set specific goals that will increase prescriber utilization of PDMPs.

Example: Minnesota replaced paper-based PDMP enrollment with automated registration system

As detailed in the report, Minnesota implemented an automated system for registering PDMP users in 2012, replacing a previous paper-based process that required having applications notarized, and then mailed or scanned. The speed and ease of registration likely helps incentivize prescriber enrollment with the PDMP, while saving time that the PDMP staff would otherwise spend on manually processing applications. The automated registration system gives prescribers and pharmacists almost immediate access to PDMP data after applications are electronically approved; most applicants have their login credentials within 15 minutes of application submission. The time to gain registration approval decreased from up to seven days to just 10 minutes. Prior to the 2012 implementation date, the **current situation** was paper-based PDMP enrollment; the **desired goal**, automated PDMP registration, was successfully achieved with funding from a federal grant.

Identify and categorize stakeholders

Stakeholders will come from many fields, such as health care, law enforcement, information technology, and patient advocates.

Examples of Potential PDMP Stakeholders in the Public Health System

- Health care providers
- Professional licensure boards
- Elected officials
- Law enforcement
- Judges
- Health information exchanges
- Third-party payers
- Researchers
- Mental health
- Drug treatment facilities
- Patient advocates
- Patients
- General public

Each stakeholder plays a role, whether large or small. Knowing who will support or challenge change will inform the facilitators and barriers that may be faced as well as goals to prioritize. Brainstorm all entities with a stake in PDMP laws, regulations, or operations and categorize each entity by stakeholder type, utilizing Worksheet 2:

- **Supporters:** Already support the change
- **Fence sitters:** Could support the change, or not
- **Challengers:** Unlikely to support the change without compromise
- **Unknowns:** Don't know where they stand

Supporters will serve as allies as you try to initiate change and may help foster relationships with other supporters. Fence sitters can be persuaded to support the change, particularly if it is framed in a way that appeals to the stakeholder's interests or bottom line. While some challengers may be persuaded by the right argument or compromise, consider limiting time spent trying to persuade them that proposed changes are the right course of action. It is important to be aware of who the challengers are, especially if there are many, because they may prove to be a major barrier. Finally, there will be stakeholders who have an opinion you don't know about, or unknowns who could possibly be champions for the proposed change, be convinced of the course of action, or may outright challenge any change to PDMP laws, regulations, or operations.

Analyze facilitators and barriers to implementing each PDMP feature

For each PDMP practice, think critically about the factors that will help to support change (facilitators) and which factors will hinder or block change (barriers). Use Worksheet 3 to record the identified facilitators and barriers, as well as strategies for overcoming them.

Example: Facilitators and barriers to real-time PDMP reporting in Oklahoma

In January 2012, Oklahoma instituted real-time reporting of controlled substance dispensing information. The Oklahoma experience demonstrates the feasibility of real-time reporting, should a state decide to implement this PDMP feature. As described in the case study, the **facilitators** to improving data timeliness were the prescribers, particularly emergency department physicians who were concerned about incomplete controlled substance prescription histories at the time of a patient encounter. **Barriers** included legislators and other stakeholders who were opposed to real-time reporting because of concerns with pharmacy workflow and costs. As a strategy for overcoming barriers, the PDMP project team formed an advisory committee to ensure that perspectives from all stakeholders were taken into account. The advisory committee included representation from chain and independent pharmacies; software and data collection vendors; professional licensing boards; trade organizations; emergency room, primary care, and veterinary providers; and state regulatory agencies. The PDMP team worked closely with legislative committees to create support for the project and built in sufficient lead time to enable pharmacies to meet the deadline for the system's launch.

Prioritize your goals

Consider all stakeholders, facilitators, and barriers, and organize the desired goals by level of impact and effort. Complete Worksheet 4 to organize your desired goals by level of impact and effort. In addition to stakeholders, facilitators, and barriers, the amount of impact and effort may be influenced by factors unique to your state.

High-impact, low-effort goals should be prioritized as they can be more easily accomplished than others. **High-impact, high-effort goals** require significant planning and the activities completed toward these goals will take considerably more time. Goals that are **low-impact, low-effort** are low priority and should be done only after high-impact goals are complete or in the process of becoming complete. Finally, **high-effort, low-impact** goals are the lowest priority as these will take a lot of resources to complete but will have little impact.

Develop a strategic plan

Use Worksheet 5 to develop a strategic plan. Then share the strategic plan with partner agencies and other stakeholders. For each goal:

1. Define the tasks or activities necessary for its completion.
2. Determine the measures of success (e.g., benchmarks) that will indicate whether the task or activity has been completed.
3. Describe the resources needed to meet each benchmark.
4. Among the identified stakeholders, consider the most appropriate parties to complete the specific task or project.
5. Set a realistic target completion date.

Planning for sustainability

While some tasks outlined in the strategic plan will have clear end dates, many others will need to continue in order to achieve your goals. Plans for sustainability will vary, based on a number of factors that will differ on a state-by-state basis. As tasks are implemented, consider the following questions:

- Which tasks or activities can and should be sustained?
- What is the benefit of continuing this task or activity?
- Has this task been effective in supporting the implementation of the goal?
- Do any new measurable outcomes demonstrate success of a particular task or activity?
- Should certain aspects of the strategic plan be changed or emphasized?
- How can you better manage relationships with partners, stakeholders, and the community?
- How can champions further assist or support your goals and activities?
- How can leadership and staff, internally or externally, support successful completion of the activities in your strategic plan?

Worksheet 1

Current Situation and Desired Goals

PDMP practices	Current situation	Desired goal
Prescriber use mandates		
Delegation		
Unsolicited reports		
Data timeliness		
Streamlined enrollment		
Educational and promotional initiatives		
Health information technology (IT) integration		
Enhanced user interfaces		
Other practice(s)		

Worksheet 2

Identify and Categorize Stakeholders

PDMP features	Stakeholders			
	Supporters	Fence sitters	Challengers	Unknowns
Prescriber use mandates				
Delegation				
Unsolicited reports				
Data timeliness				
Streamlined enrollment				
Educational and promotional initiatives				
Health information technology (IT) integration				
Enhanced user interfaces				
Other practice(s)				

Worksheet 3

Facilitators and Barriers

PDMP features	Facilitators	Barriers	Strategies for overcoming barriers
Prescriber use mandates			
Delegation			
Unsolicited reports			
Data timeliness			
Streamlined enrollment			
Educational and promotional initiatives			
Health information technology (IT) integration			
Enhanced user interfaces			
Other practice(s)			

Impact-Effort Decision Matrix

	Low effort	High effort
High impact		
Low impact		

Select one to three priority goals and enter them in the space below.

Goal 1

Goal 2

Goal 3

Worksheet 5
 Strategic Plan

Goal 1	Measures of success/ benchmarks	Resources needed	Responsible parties	Target completion date
Task/activity:				
Task/activity:				
Task/activity:				

Goal 2	Measures of success/ benchmarks	Resources needed	Responsible parties	Target completion date
Task/activity:				
Task/activity:				
Task/activity:				

Continued on next page

Goal 3	Measures of success/ benchmarks	Resources needed	Responsible parties	Target completion date
Task/activity:				
Task/activity:				
Task/activity:				

Appendix C: Methodology

Literature review

We conducted a review of the scientific literature (PubMed, Google Scholar) from 2012 through September 2015 for articles pertaining to PDMPs that made reference to the eight evidence-based practices. All articles from peer-reviewed journals, published in English, were considered for inclusion. In addition to permutations of search terms such as “prescription monitoring program” or “PDMP,” the following search terms were used for specific practices: (1) “prescriber mandates,” “mandatory use,” “mandating PDMP use”; (2) “unsolicited reporting,” “unsolicited report,” “proactive PDMP reporting”; (3) “delegates,” “delegate access,” “delegating,” “subaccounts” and “staff”; (4) “electronic health record,” “electronic medical record,” “integration”; (5) “user friendly interface,” “interface design,” “interface usability,” “decision support tool,” “NARxCHECK,” “barriers to use”; (6) “real-time data,” “real time reporting,” “data timeliness”; (7) “educational training,” “promotional campaigns,” “promotion of PDMP use,” “improve PDMP use”; (8) “streamlining enrollment,” “streamlined enrollment,” and “enrollment barriers.” Abstracts identified through searches were reviewed, and those with potential relevance were retrieved for further consideration. References cited in identified journal articles were also considered for inclusion.

For the case studies, we searched state websites for reports, briefings, presentations, and other documents that described the implementation, operation, or assessment of specific practices. We also searched for additional information on federal websites, particularly those for CDC and SAMHSA, as well as websites of nongovernmental organizations including the Prescription Drug Monitoring Center of Excellence and the Prescription Drug Monitoring Program Training and Technical Assistance Center, Brandeis University; National Alliance for Model State Drug Laws; Association of State and Territorial Health Officials; National Governors Association; National Safety Council; and Federation of State Medical Boards.

Case study states

States were selected for case studies based on a number of criteria, including, but not necessarily limited to (nor requiring) each of the following:

- Implementation of an effective model of the PDMP practice or early adoption or development of a practice not yet widely implemented.
- Availability of peer-reviewed literature concerning the state’s PDMP practice.
- Availability of publicly accessible reports, briefings, presentations, and other information sufficient to document the practice in the state.
- Availability of data on process measures, such as prescriber registration in, and utilization of, the state PDMP.
- Availability of data on patient risk and outcomes measures.
- Demonstration of evidence-based planning for and implementation of the practice.
- Evidence for unique or different approaches to implementing aspects of the PDMP practice.
- Variability among case study states, to the extent feasible, in geography, population size, and time the program has been operational.

A pool of potential case study states meeting at least some of these criteria was initially identified based on information (e.g., white papers, briefings, evaluations, presentations) previously gathered by the PDMP Center of Excellence. The potential pool of case study states and preliminary plans for the report were peer-reviewed by experts selected by The Pew Charitable Trusts, and comments were taken into account in making final selections. Final selection of case study states was ultimately based on the outcomes of subsequent literature reviews on the states.

PDMP administrators of case study states were contacted to request public documents pertinent to the practice that might not be available through the state website. PDMP administrators were also afforded the opportunity to review and comment on the draft case studies pertaining to their states.

Survey

In November through December 2015, a survey was sent via email to administrators of all operational PDMPs requesting that respondents indicate the adoption status of the eight practices for their state and whether the state was engaged in each of the practices. The survey was pre-populated with the most recent information on adoption available from previous research by the PDMP Training and Technical Assistance Center and the National Alliance for Model State Drug Laws. States were invited to review, and if necessary, correct the information. For some of the practices we asked respondents to describe its characteristics; for example, if a state had enacted a prescriber mandate, researchers asked respondents to specify the conditions that would trigger required prescriber review of PDMP data. Lastly, we asked states to provide the total enrollment of in-state prescribers to the PDMP as of December 2014 and September 2015 and total queries to the PDMP by prescribers and prescriber delegates in calendar year 2014.

Appendix D: States Mandating That Prescribers Make Comprehensive Use of PDMP Data Prior to Issuing Controlled Substance Prescriptions

State		CT	KY
Effective date		10/1/2015	7/20/2012
Legal authority	State law	✓	✓
	Regulations		✓
Drugs included	DEA Schedules II-IV	✓	✓‡
	Opioids & benzodiazepines		
	Opioids only		
	Other	DEA Schedule V	
Timing triggers	All prescriptions		
	Initial prescription	✓	✓
	Every 90 days	✓	✓
	Every 180 days		
	Annually		
Exceptions	Number of days' supply exempt	3	
	Terminally ill patient		✓
	Inpatient at hospital or long-term care facility†	✓	✓ (When hospitals or long-term care facilities have an institutional account and place the patient's report in his or her medical record upon admission)
	PDMP inaccessible		✓
	Other		During an emergency or following surgery; single-dose treatments to relieve symptoms from a procedure; cancer pain
Statutory purpose for accessing data			
Compliance			Disciplinary sanctions by licensing board

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State		MA	NJ
Effective date		1/1/16	11/1/15
Legal authority	State law	✓	✓
	Regulations	✓	
Drugs included	DEA Schedules II-IV		
	Opioids & benzodiazepines	✓ ^s	
	Opioids only		
	Other		DEA Schedule II for acute or chronic pain
Timing triggers	All prescriptions		
	Initial prescription	✓ ^{**}	✓
	Every 90 days		✓
	Every 180 days		
	Annually		
Exceptions	Number of days' supply exempt	5 days for ER departments only	5 days for ER departments only
	Terminally ill patient	✓	✓ (Under hospice care)
	Inpatient at hospital or long-term care facility ⁱ	✓	✓
	PDMP inaccessible		✓
	Other	During an emergency, when utilizing the PDMP is likely to result in patient harm; for a patient younger than 8	Veterinarian prescriptions; administration of methadone or other controlled substance for patient on a treatment program waiting list; practitioner-administering a controlled substance; if PDMP consultation would adversely affect patient's medical condition; granting of waiver by PDMP for technology limitations; following surgery when less than 30-day supply.
	Statutory purpose for accessing data		
Compliance			

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State		NM	NV
Effective date		11/20/12 to 4/24/14 - Each licensing board sets date	10/1/15
Legal authority	State law		✓
	Regulations	✓	✓
Drugs included	DEA Schedules II-IV	✓	✓
	Opioids & benzodiazepines		
	Opioids only		
	Other		
Timing triggers	All prescriptions		
	Initial prescription	✓	✓
	Every 90 days	✓	
	Every 180 days		
	Annually		
Exceptions	Number of days' supply exempt	4	7
	Terminally ill patient	✓ (Under hospice care)	
	Inpatient at hospital or long-term care facility [†]		✓
	PDMP inaccessible		✓
	Other		Prescriber works in hospital ER. Board of Pharmacy must issue regulations allowing hospital staff to access data for prescriber. Mandate excludes an ongoing prescription to continue a course of treatment for an existing patient.
Statutory purpose for accessing data		To assist practitioners in balancing the safe use of controlled substances with the need to impede illegal and harmful activities involving these pharmaceuticals.	To assess whether the controlled substances prescription is medically necessary.
Compliance			Prescriber is subject to professional discipline if licensing board determines an intentional violation; this is not a misdemeanor.

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State		NY	OH
Effective date		8/27/13	4/1/15
Legal authority	State law	✓	✓
	Regulations	✓	✓
Drugs included	DEA Schedules II-IV	✓	
	Opioids & benzodiazepines		✓
	Opioids only		
	Other		
Timing triggers	All prescriptions	✓	
	Initial prescription		✓
	Every 90 days		✓
	Every 180 days		
	Annually		
Exceptions	Number of days' supply exempt	5 days for ER departments; 5 days if it is not possible to access the PDMP in a timely manner, and no other practitioner or delegate is available to access it.	7
	Terminally ill patient	✓ (Under hospice care)	✓
	Inpatient at hospital or long-term care facility [†]	✓	✓
	PDMP inaccessible	✓	✓
	Other	Veterinarian prescriptions; administration of methadone or other controlled substances for patient on a treatment program waiting list; practitioner-administered controlled substance; if PDMP consultation would adversely affect patient's medical condition; or granting of waiver from PDMP due to technology limitations.	
Statutory purpose for accessing data	To review a patient's controlled substance history.	The prescriber shall assess the information in the report and note the assessment and findings in the patient's medical record.	
Compliance	Violators may be fined up to \$1,000 per violation; up to one year in jail and permanent revocation of a professional license.	Disciplinary sanctions by licensing board	

Continued on next page, footnotes on Page 81

State		OK	PA
Effective date		11/1/15	6/30/15
Legal authority	State law	✓	✓
	Regulations		
Drugs included	DEA Schedules II-IV		✓
	Opioids & benzodiazepines	✓	
	Opioids only		
	Other	Carisoprodol	DEA Schedule V
Timing triggers	All prescriptions		
	Initial prescription	✓	✓
	Every 90 days		
	Every 180 days	✓	
	Annually		
Exceptions	Number of days' supply exempt		
	Terminally ill patient	✓	
	Inpatient at hospital or long-term care facility ⁱ	✓	
	PDMP inaccessible		
	Other		
Statutory purpose for accessing data		To assess medical necessity and the possibility that the patient may be unlawfully obtaining prescription drugs in violation of the Uniform Controlled Dangerous Substances Act.	For purpose of establishing a baseline and a thorough medical record.
Compliance		State licensing boards alone shall enforce mandate. The PDMP administrator shall provide a monthly list of top 20 prescribers to licensing boards, and shall notify boards when prescribing outside of laws, rules and practice limits is identified.	

Continued on next page, footnotes on Page 81

State		RI	TN
Effective date		3/1/15	4/1/13
Legal authority	State law		✓
	Regulations	✓	✓
Drugs included	DEA Schedules II-IV		✓
	Opioids & benzodiazepines		✓
	Opioids only	✓	
	Other		DEA Schedule V identified by the committee as demonstrating a potential for abuse.
	All prescriptions		
Timing triggers	Initial prescription	✓	✓
	Every 90 days	✓ (For patients on continuous opioid therapy with an intrathecal pump for 3 months or longer.)	
	Every 180 days		
	Annually	✓ (For patients on continuous opioid therapy for pain for 6 months or longer.)	✓
	Number of days' supply exempt		7 days if non-refillable
Exceptions	Terminally ill patient		✓ (Under hospice care)
	Inpatient at hospital or long-term care facility†		✓
	PDMP inaccessible		
	Other		Patient under care of prescriber in a specialty exempted by state committee; non-refillable prescriptions issued following surgery.
	Statutory purpose for accessing data		
Compliance			Disciplinary sanctions by licensing boards.

Continued on next page, footnotes on Page 81

State		WV
Effective date		5/6/2013 to 6/1/2014 - Each licensing board sets date
Legal authority	State law	✓
	Regulations	✓
Drugs included	DEA Schedules II-IV	
	Opioids & benzodiazepines	
	Opioids only	✓
	Other	
Timing triggers	All prescriptions	
	Initial prescription	✓
	Every 90 days	
	Every 180 days	
	Annually	✓
Exceptions	Number of days' supply exempt	
	Terminally ill patient	✓
	Inpatient at hospital or long-term care facility [†]	
	PDMP inaccessible	✓
	Other	
Statutory purpose for accessing data		
Compliance		

Notes: This table includes states with comprehensive use mandates in place at the end of 2015. Comprehensive prescriber use mandates apply to all prescribers and, at minimum, to all initial opioid prescriptions issued to patients.

† Generally, states do not consider medication orders for inpatients in hospitals and long-term care facilities that have pharmacies to be prescriptions; medications are considered to be administered, not dispensed. Thus, mandates on prescribers to obtain PDMP reports prior to issuing a prescription do not apply to inpatient care. The states with listed exceptions have a statute and/or regulation that explicitly states the mandate is not applicable.

‡ Kentucky's mandate includes Schedule II and Schedule III hydrocodone, according to state statute; all other Schedule II-IV drugs, according to boards of medicine and nursing regulations; and some benzodiazepines, according to boards of dentistry and podiatry.

§ The Massachusetts mandate includes narcotic drugs in Schedule II and Schedule III, according to statute; and benzodiazepines in Schedule IV, according to Department of Public Health regulations.

** Massachusetts requires a registered individual practitioner to utilize the prescription drug monitoring program each time the prescriber issues a prescription to a patient for any drug in Schedules II and III that has been determined by the Department of Public Health to be commonly misused or abused and which has been designated as a drug that needs additional safeguards in guidance to be issued by the state agency.

Sources: Survey conducted by Brandeis University's PDMP Center of Excellence and The Pew Charitable Trusts from November to December 2015; National Alliance for Model State Drug Laws; state PDMPs; state legislative sessions and administrative codes

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Appendix E: Status of Adoption of Evidence-Based Practices to Optimize Prescriber Use of PDMPs

State	PDMP start date	Unsolicited reports	Delegation	Streamlined enrollment	Prescriber use mandate	Educational and promotional activities	Mandated training	Health IT integration	Enhanced User interfaces	Dispenser reporting interval
Alabama	2006	✓	✓	✓	×	✓	×	×	✓	Daily
Alaska	2011	×	×	×	×	×	×	×	×	Monthly
Arizona	2008	✓	✓	✓	✓	✓	×	×	×	Daily
Arkansas	2013	×	✓	✓	✓	✓	×	×	×	Weekly
California	1939	×	×	×	×	✓	×	×	✓	Weekly
Colorado	2007	✓	✓	✓	✓	✓	×	×	×	Daily
Connecticut	2008	✓	✓	✓	✓	✓	×	×	✓	Weekly
Delaware	2012	✓	✓	✓	✓	✓	×	×	×	Daily
District of Columbia ¹	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Florida	2011	✓	×	✓	×	✓	×	×	×	Weekly
Georgia	2013	×	×	✓	✓	✓	×	×	×	Weekly
Guam	2013	×	✓	✓	✓	✓	✓	×	×	Biweekly
Hawaii ²	1943	✓	N/A	N/A	×	N/A	N/A	N/A	N/A	Weekly
Idaho	1967	✓	✓	✓	×	✓	×	×	×	Daily
Illinois	1968	✓	×	✓	×	✓	×	✓	×	Daily
Indiana	1998	✓	×	✓	✓	✓	×	×	✓	Daily
Iowa	2009	×	✓	✓	×	✓	×	×	×	Weekly
Kansas	2011	✓	✓	✓	×	×	×	✓	×	Daily
Kentucky	1999	×	✓	×	✓	✓	✓	×	✓	Daily
Louisiana	2008	✓	✓	×	✓	✓	✓	✓	×	Daily
Maine	2004	✓	✓	✓	×	✓	×	✓	✓	Daily
Maryland	2013	✓	✓	✓	×	✓	×	✓	×	Within 3 days

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State	PDMP start date	Unsolicited reports	Delegation	Streamlined enrollment	Prescriber use mandate	Educational and promotional activities	Mandated training	Health IT integration	Enhanced User interfaces	Dispenser reporting interval
Massachusetts	1994	✓	✓	✓	✓	✓	✓	✓	✓	Daily
Michigan	1989	✓	×	✓	×	✓	✓	✓	✓	Daily
Minnesota	2010	✓	✓	✓	✓	✓	✓	✓	✓	Daily
Missouri ⁱ	2005	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mississippi	N/A	×	✓	✓	✓	✓	✓	✓	✓	Daily
Montana	2012	×	✓	✓	×	✓	✓	✓	✓	Weekly
Nebraska ^s	2011	×	✓	✓	×	✓	✓	✓	×	Near real time
Nevada	1997	✓	✓	✓	✓	✓	✓	✓	✓	Daily
New Hampshire	2014	✓	✓	✓	×	✓	×	×	×	Weekly
New Jersey	2011	✓	✓	✓	✓	✓	✓	✓	✓	Daily
New Mexico	2005	✓	✓	✓	✓	×	✓	×	×	Daily
New York	1973	×	✓	✓	✓	✓	×	×	×	Daily
North Carolina	2007	✓	✓	✓	✓	✓	×	×	×	Within 3 days
North Dakota	2007	✓	✓	×	✓	×	×	✓	✓	Daily
Ohio	2006	×	✓	✓	✓	✓	×	✓	×	Daily
Oklahoma	1991	✓	✓	✓	✓	✓	×	✓	✓	Real time
Oregon	2011	×	✓	×	×	✓	×	×	✓	Within 3 days
Pennsylvania ^{**}	1973	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Rhode Island	1979	✓	✓	×	✓	✓	×	×	✓	Within 3 days
South Carolina	2008	×	✓	✓	✓	✓	✓	✓	✓	Daily
South Dakota	2011	✓	✓	×	✓	✓	×	✓	✓	Weekly
Tennessee	2006	×	✓	✓	✓	✓	✓	✓	✓	Daily
Texas	1982	×	✓	✓	×	✓	×	×	×	Weekly
Utah	1996	✓	✓	✓	×	×	✓	×	✓	Daily

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State	PDMP start date	Unsolicited reports	Delegation	Streamlined enrollment	Prescriber use mandate	Educational and promotional activities	Mandated training	Health IT integration	Enhanced User interfaces	Dispenser reporting interval
Vermont	2009	✓	✓	✓	✓	✓	✓	×	×	Weekly
Virginia	2003	✓	✓	✓	✓	✓	×	×	✓	Weekly
Washington	2011	×	✓	✓	✓	✓	×	✓	×	Weekly
West Virginia	1995	✓	✓	✓	✓	✓	✓	×	×	Daily
Wisconsin	2013	✓	✓	✓	×	✓	×	✓	×	Weekly
Wyoming	2004	✓	×	×	×	×	×	×	×	Daily
Totals		32	40	39	27	40	13	14	18	

* The District of Columbia PDMP was not operational when this survey was conducted; legislation was enacted in 2014.

† Hawaii officials did not respond to this survey; historical data were incorporated.

‡ Missouri does not have authority to establish a PDMP.

§ Nebraska dispenser data are made available to the PDMP through the health information network Surescripts on a near-instantaneous basis, but some pharmacies submit data daily.

** The Pennsylvania PDMP was transitioning to the state Department of Health; data unavailable.

Source: Survey of PDMPs conducted by Brandeis University PDMP Center of Excellence and The Pew Charitable Trusts from November to December 2015

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Endnotes

- 1 Centers for Disease Control and Prevention, "Number and Age-Adjusted Rates of Drug-Poisoning Deaths Involving Opioid Analgesics and Heroin: United States, 2000–2014," accessed Jan. 28, 2016, http://www.cdc.gov/nchs/data/health_policy/AADR_drug_poisoning_involving_OA_Heroin_US_2000-2014.pdf.
- 2 Elizabeth H. Crane, "Emergency Department Visits Involving Narcotic Pain Relievers," *The CBHSQ Report*, Substance Abuse and Mental Health Services Administration (2015), http://www.samhsa.gov/data/sites/default/files/report_2083/ShortReport-2083.html.
- 3 Centers for Disease Control and Prevention, "Today's Heroin Epidemic," accessed Jan. 28, 2016, <http://www.cdc.gov/vitalsigns/heroin>.
- 4 Centers for Disease Control and Prevention, "Number and Age-Adjusted Rates."
- 5 Centers for Disease Control and Prevention "CDC Guideline for Prescribing Opioids for Chronic Pain—United States, 2016," *Morbidity and Mortality Weekly Report* 65, no. 1 (2016): 1–49, accessed April 18, 2016, <http://www.cdc.gov/mmwr/volumes/65/rr/rr6501e1.htm>.
- 6 Prescription Drug Monitoring Program Training and Technical Assistance Center, "Prescription Drug Monitoring Frequently Asked Questions," accessed March 9, 2016, <http://www.pdmpassist.org/content/prescription-drug-monitoring-frequently-asked-questions-faq>.
- 7 The White House, Office of National Drug Control Policy, "National Drug Control Strategy, 2015," https://www.whitehouse.gov/sites/default/files/ondcp/policy-and-research/2015_national_drug_control_strategy_0.pdf.
- 8 The White House, Office of the Press Secretary, "Obama Administration Announces Public and Private Sector Efforts to Address Prescription Drug Abuse and Heroin Use," Oct. 21, 2015, <https://www.whitehouse.gov/the-press-office/2015/10/21/fact-sheet-obama-administration-announces-public-and-private-sector>.
- 9 Prescription Drug Monitoring Program Center of Excellence, *Briefing on PDMP Effectiveness* (Waltham, MA: Brandeis University, September 2014), <http://www.pdmpexcellence.org/sites/all/pdfs/Briefing%20on%20PDMP%20Effectiveness%203rd%20revision.pdf>; Thomas Clark et al., *Prescription Drug Monitoring Programs: An Assessment of the Evidence for Best Practices* (Waltham, MA: Prescription Drug Monitoring Program Center of Excellence at Brandeis University, September 2012), http://www.pewtrusts.org/-/media/assets/0001/pdmp_update_1312013.pdf; Richard Deyo et al., "Measures Such as Interstate Cooperation Would Improve the Efficacy of Programs to Track Controlled Drug Prescriptions," *Health Affairs* 32, no. 3 (2013): 603–13, <http://content.healthaffairs.org/content/early/2013/02/13/hlthaff.2012.0945>.
- 10 Clark et al., *Prescription Drug Monitoring Programs*.
- 11 Theodore J. Cicero et al., "The Changing Face of Heroin Use in the United States: A Retrospective Analysis of the Past 50 Years," *JAMA Psychiatry* 71, no. 7 (2014): 821–26, <http://dx.doi.org/10.1001/jamapsychiatry.2014.366>.
- 12 Christi Hildebran et al., "How Clinicians Use Prescription Drug Monitoring Programs: A Qualitative Inquiry," *Pain Medicine* 15, no. 7 (2014): 1179–86, <http://dx.doi.org/10.1111/pme.12469>.
- 13 Terri D'Arrigo, "Dismissing Patients Always a Last Resort," *ACP Internist* (September 2013), <http://www.acpinternist.org/archives/2013/09/dismiss.htm>.
- 14 David F. Baehren et al., "A Statewide Prescription Monitoring Program Affects Emergency Department Prescribing Behaviors," *Annals of Emergency Medicine* 56, no. 1 (2010): 19–23, <http://dx.doi.org/10.1016/j.annemergmed.2009.12.011>, <http://www.ncbi.nlm.nih.gov/pubmed/20045578>; Traci C. Green et al., "How Does Use of a Prescription Monitoring Program Change Medical Practice?" *Pain Medicine* 12, no. 10 (2012): 1314–23, <http://dx.doi.org/10.1111/j.1526-4637.2012.01452>; Lance Feldman et al., "Influencing Controlled Substance Prescribing: Attending and Resident Physician Use of a State Prescription Monitoring Program," *Pain Medicine* 13, no. 7 (2012): 908–14, <http://dx.doi.org/10.1111/j.1526-4637.2012.01412.x>; Elle M. Sowa et al., "Prevalence of Substance Misuse in New Patients in an Outpatient Psychiatry Clinic Using a Prescription Monitoring Program," *Primary Care Companion for CNS Disorders* 16, no. 1 (2014), <http://dx.doi.org/10.4088/PCC.13m01566>; Indiana University Center for Health Policy, *Key Findings and Recommendations From the 2013 IPLA INSPECT Knowledge and Use Survey* (June 2014), http://www.in.gov/pla/inspect/files/IPLA_Inspect_Summary_Report.pdf; Oregon Health Authority, *Early Assessment of the Prescription Drug Monitoring Program: A Survey of Providers* (January 2013), http://www.orpdmp.com/orpdmpfiles/PDF_Files/Reports/PDES_PDMPeval_01.10.13.pdf; Kentucky Cabinet for Health and Family Services and Kentucky Injury Prevention and Research Center, *2010 KASPER Satisfaction Survey Executive Summary* (December 2010), <http://www.chfs.ky.gov/NR/rdonlyres/BDCODFC9-924B-4F11-A10A-5EB17933FDDB/0/2010KASPERsatisfactionSurveyExecutiveSummary.pdf>; Muskie School of Public Service, *Impact Evaluation of Maine's Prescription Drug Monitoring Program* (March 2007), <http://muskie.usm.maine.edu/Publications/ihp/PrescDrugMonitoringPgrmExecSum.pdf>; Cindy Parks Thomas et al., "Prescriber Response to Unsolicited Prescription Drug Monitoring Program Reports in Massachusetts," *Pharmacoepidemiology and Drug Safety* 23, no. 9 (2014): 950–57, <http://dx.doi.org/10.1002/pds.3666>.
- 15 Prescription Drug Monitoring Program Center of Excellence, *COE Briefing—Mandating PDMP Participation by Medical Providers: Current Status and Experience in Selected States, Revision 2* (Waltham, MA: Brandeis University, October 2014).

- 16 Amanda Garrett, Indiana PDMP staff, pers. comm., October 2015. Regarding Indiana, "I know that many employers (e.g., IU Health or Walgreens) now require an active INSPECT account as a condition of employment"; Richard Deyo et al., "Leading a Horse to Water: Facilitating Registration and Use of a Prescription Drug Monitoring Program," *Clinical Journal of Pain* (2014), <http://dx.doi.org/10.1097/AJP>.
- 17 Prescription Drug Monitoring Program Training and Technical Assistance Center, "PDMP Mandatory Enrollment of Prescribers and Dispensers," last updated Feb. 29, 2016, http://www.pdmpassist.org/pdf/Mandatory_Enrollment.pdf.
- 18 Prescription Drug Monitoring Program Training and Technical Assistance Center, "PDMP Mandatory Query by Prescribers and Dispensers," last updated Feb. 29, 2016, http://www.pdmpassist.org/pdf/Mandatory_Query.pdf.
- 19 Prescription Drug Monitoring Program Training and Technical Assistance Center, "Law Enforcement Access to PDMP Reports," accessed Feb. 3, 2016, http://www.pdmpassist.org/pdf/Law_Enforcement_Access_Methods.pdf.
- 20 Prescription Drug Monitoring Program Center of Excellence, *Using PDMP Data to Guide Interventions With Possible At-Risk Prescribers* (Waltham, MA: Brandeis University, October 2014), http://www.pdmpassist.org/pdf/COE_documents/Add_to_TTAC/Using_PDMP_Data_Guide_Interventions_at_Risk_Prescribers.pdf; Prescription Drug Monitoring Program Center of Excellence, *Guidance on PDMP Best Practices: Options for Unsolicited Reporting* (Waltham, MA: Brandeis University, October 2014), http://www.pdmpassist.org/pdf/COE_documents/Add_to_TTAC/Update%20to%20Brandeis%20COE%20Guidance%20on%20Unsolicited%20Reporting%20final.pdf.
- 21 Prescription Drug Monitoring Program Center of Excellence, *Notes From the Field—Monitoring and Changing Behavior: The Role of PMP Data in Kentucky Drug Courts* (Waltham, MA: Brandeis University, August 2011), http://www.pdmpassist.org/pdf/COE_documents/Add_to_TTAC/KY_Drug_Court_NFF_8_30_11.pdf.
- 22 Prescription Drug Monitoring Program Center of Excellence, *PDMPs and Third Party Payers Meeting December 2012, Report of Proceedings* (Waltham, MA: Brandeis University, April 2014), http://www.pdmpassist.org/pdf/COE_documents/Add_to_TTAC/Brandeis_COE_PDMP_3rd_pty_payer_mtg_rpt.pdf; Nathaniel P. Katz et al., "Prescription Opioid Abuse: Challenges and Opportunities for Payers," *American Journal of Managed Care* 19, no. 4 (2013): 295–302, <http://www.ajmc.com/journals/issue/2013/2013-1-vol19-n4/Prescription-Opioid-Abuse-Challenges-and-Opportunities-for-Payers>.
- 23 PDMP Training and Technical Assistance Center, "PDMPs Authorized and Engaged in Sending Solicited and Unsolicited Reports to Public and Private Insurance Entities," last updated Sept. 22, 2015, http://www.pdmpassist.org/pdf/Insurance_Entity_Table.pdf.
- 24 Prescription Drug Monitoring Program Center of Excellence at Brandeis University, "Prescription Behavior Surveillance System," accessed March 9, 2016, <http://www.pdmpassist.org/content/prescription-behavior-surveillance-system>.
- 25 Caitlin Conrad et al., "Community Outbreak of HIV Infection Linked to Injection Drug Use of Oxycodone: Indiana, 2015," *Centers for Disease Control and Prevention, Morbidity and Mortality Weekly Report* 64, no. 16 (2015): 443–44, http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6416a4.htm?s_cid=mm6416a4_e.
- 26 Prescription Drug Monitoring Program Center of Excellence, *Notes From the Field—Project Lazarus: Using PDMP Data to Mobilize and Measure Community Drug Abuse Prevention* (Waltham, MA: Brandeis University, June 2012), http://pdmpassist.org/pdf/COE_documents/Add_to_TTAC/project_lazarus_nff_a.pdf.
- 27 Prescription Drug Monitoring Program Center of Excellence, *Guidance on PDMP Best Practices*.
- 28 Prescription Drug Monitoring Program Center of Excellence, *Notes From the Field—Drug-Related Deaths in Virginia: Medical Examiner Use of PMP Data* (Waltham, MA: Brandeis University, December 2011), http://www.pdmpassist.org/pdf/COE_documents/Add_to_TTAC/va_medical_examiner_NFF_final.pdf.
- 29 Prescription Drug Monitoring Program Center of Excellence, *Briefing on PDMP Effectiveness*; Deyo et al., "Interstate Cooperation"; Lainie Rutkow et al., "Effect of Florida's Prescription Drug Monitoring Program and Pill Mill Laws on Opioid Prescribing and Use," *JAMA Internal Medicine* (Aug. 17, 2015), <http://dx.doi.org/10.1001/jamainternmed.2015.3931>; Hallam Gugelman et al., "Windmills and Pill Mills: Can PDMPs Tilt the Prescription Drug Epidemic?" *Journal of Medical Toxicology* 8, no. 4 (2012): 378–86, <http://link.springer.com/article/10.1007/s13181-012-0273-8>; Chris Delcher et al., "Abrupt Decline in Oxycodone-Caused Mortality After Implementation of Florida's Prescription Drug Monitoring Program," *Drug and Alcohol Dependence* 150 (2015): 63–68, <http://dx.doi.org/10.1016/j.drugalcdep.2015.02.010>; Prescription Drug Monitoring Program Center of Excellence, "Briefing on PDMP Effectiveness" (Waltham, MA: Brandeis University, 2014), http://www.pdmpassist.org/pdf/COE_documents/Add_to_TTAC/Briefing%20on%20PDMP%20Effectiveness%203rd%20revision.pdf.
- 30 Guohua Li et al., "Prescription Drug Monitoring and Drug Overdose Mortality," *Injury Epidemiology* 1, no. 9 (2014), <http://www.biomedcentral.com/content/pdf/2197-1714-1-9.pdf>.
- 31 Delcher et al., "Abrupt Decline"; Patricia R. Freeman et al., *Kentucky House Bill 1 Impact Evaluation* (Lexington, KY: University of Kentucky, Institute for Pharmaceutical Outcomes and Policy, March 2015), <http://www.chfs.ky.gov/NR/rdonlyres/8D6EBE65-D16A-448E-80FF-30BED11EBDEA/0/KentuckyHB1ImpactStudyReport03262015.pdf>.

- 32 David F. Baehren et al., “A Statewide Prescription Monitoring Program”; Green et al., “How Does Use of a Prescription Monitoring Program”; Feldman et al., “Influencing Controlled Substance Prescribing”; Sowa et al., “Prevalence of Substance Misuse”; Indiana University Center for Health Policy, *Key Findings and Recommendations*; Oregon Health Authority, *Early Assessment*; Kentucky Cabinet for Health and Family Services, *2010 KASPER Satisfaction Survey*; Muskie School of Public Service, *Impact Evaluation*; Thomas et al., “Prescriber Response.”
- 33 Lainie Rutkow et al., “Most Primary Care Physicians Are Aware of Prescription Drug Monitoring Programs, but Many Find the Data Difficult to Access,” *Health Affairs* 34, no. 3 (2015): 484-92, <http://dx.doi.org/10.1377/hlthaff.2014.1085>.
- 34 Rutkow et al., “Most Primary Care Physicians.”
- 35 Survey conducted by Brandeis University PDMP Center of Excellence and The Pew Charitable Trusts from November to December 2015 for this report; see Appendix A: Prescriber Enrollment and Use of PDMPs by Program. Note: Calculation includes a subset of 33 states that provided both enrollment and utilization data for prescribers in 2014, enabling comparisons among states. States and territories not included in this analysis: Alabama, Colorado, District of Columbia, Georgia, Guam, Hawaii, Mississippi, Missouri, Montana, Nevada, New Hampshire, North Carolina, Oklahoma, Pennsylvania, Rhode Island, South Carolina, Utah, Vermont, and Wisconsin.
- 36 Survey conducted by Brandeis University PDMP Center of Excellence and The Pew Charitable Trusts from November to December 2015 for this report; see Appendix A: Prescriber Enrollment and Use of PDMPs by Program. Note: Calculation includes a subset of 33 states that provided both enrollment and utilization data for prescribers in 2014, enabling comparisons among states. States and territories not included in this analysis: Alabama, Colorado, District of Columbia, Georgia, Guam, Hawaii, Mississippi, Missouri, Montana, Nevada, New Hampshire, North Carolina, Oklahoma, Pennsylvania, Rhode Island, South Carolina, Utah, Vermont, and Wisconsin.
- 37 Peter Kreiner, Ruslan Nikitin, and Thomas Pineros Shields, *Bureau of Justice Assistance Prescription Drug Monitoring Program Performance Measures Report: January 2009 Through June 2012* (Waltham, MA: Prescription Drug Monitoring Program Center of Excellence at Brandeis University, last updated April 4, 2014), http://www.pdmpassist.org/pdf/COE_documents/Add_to_TTAC/BJA%20PDMP%20Performance%20Measures%20Report%20Jan%202009%20to%20June%202012%20Final_with%20feedback.pdf.
- 38 Clark et al., *Prescription Drug Monitoring Programs*; Beth Sproule, *Prescription Monitoring Programs in Canada: Best Practice and Program Review* (Ottawa, ON: Canadian Centre on Substance Abuse, April 2015), <http://www.ccsa.ca/Resource%20Library/CCSA-Prescription-Monitoring-Programs-in-Canada-Report-2015-en.pdf>.
- 39 Prescription Drug Monitoring Program Center of Excellence, *COE Briefing—Mandating PDMP Participation*; National Alliance for Model State Drug Laws, *States That Require Prescribers and/or Dispensers to Access PMP Database in Certain Circumstances* (December 2014), <http://www.namsdl.org/library/99D9A3E8-C13E-3AF4-8746F4333CA2A421>.
- 40 Prescription Drug Monitoring Program Center of Excellence, *COE Briefing—Mandating PDMP Participation*; National Alliance for Model State Drug Laws, *States That Require Prescribers and/or Dispensers to Access PMP Database*.
- 41 National Alliance for Model State Drug Laws, *States That Require Prescribers and/or Dispensers to Access PMP Database*.
- 42 Haffajee, Jena, and Weiner, “Mandatory Use.”
- 43 Freeman et al., *Kentucky House Bill 1*.
- 44 John Eadie, “Tennessee Initiatives to Reduce the Epidemic of Opioid Overdoses and Deaths: Mandate on Prescribers to Use PDMP and Letters to Top 50 Prescribers,” unpublished data.
- 45 Prescription Drug Monitoring Program Center of Excellence, *COE Briefing—Mandating PDMP Participation*.
- 46 Survey conducted by Brandeis University PDMP Center of Excellence and The Pew Charitable Trusts from November to December 2015 for this report; see Appendix D: States Mandating That Prescribers Make Comprehensive Use of PDMP Data Prior to Issuing Controlled Substance Prescriptions and Appendix E: Status of Adoption of Evidence-Based Practices to Optimize Prescriber Use of PDMPs; National Alliance for Model State Drug Laws, *States That Allow Prescribers and/or Dispensers to Appoint a Delegate to Access the PMP* (December 2014), <http://www.namsdl.org/library/BBB38C95-A57D-76AF-8DB22F9D99EFBA4C/>.
- 47 Survey conducted by Brandeis University PDMP Center of Excellence and The Pew Charitable Trusts from November to December 2015 for this report; see Appendix E: Status of Adoption of Evidence-Based Practices to Optimize Prescriber Use of PDMPs.
- 48 National Alliance for Model State Drug Laws, *States That Require Prescribers and/or Dispensers to Access PMP Database*.
- 49 Joshua Vinciguerra, director, Bureau of Narcotic Enforcement, New York State Department of Health, pers. comm., Jan. 20, 2016.
- 50 Centers for Disease Control and Prevention, “Prevention Status Reports, National Summary: Prescription Drug Overdose,” last updated March 31, 2016, <https://wwwn.cdc.gov/psr/NationalSummary/NSPDO.aspx>.
- 51 House Bill 1, Kentucky Legislature (2012), <http://www.lrc.ky.gov/record/12ss/HB1.htm>; Statute 218A.172, Kentucky Legislature (2013), <http://www.lrc.ky.gov/Statutes/statute.aspx?id=41649>.

- 52 Kentucky Administrative Regulations, Title 201, 201 KAR 9:260, "Professional Standards for Prescribing and Dispensing Controlled Substances," <http://www.lrc.ky.gov/kar/201/009/260.htm>; Kentucky Administrative Regulations, Title 201, 201 KAR 20:057, "Scope and Standards of Practice of Advanced Practice Registered Nurses," <http://www.lrc.ky.gov/kar/201/020/057.htm>; Kentucky Administrative Regulations, Title 201, 201 KAR 8:540, "Dental Practices and Prescription Writing," <http://www.lrc.ky.gov/kar/201/008/540.htm>; Kentucky Administrative Regulations, Title 201, 201 KAR 25:090, "Prescribing and Dispensing Controlled Substances," <http://www.lrc.ky.gov/kar/201/025/090.htm>.
- 53 David Hopkins, program manager, Kentucky PDMP, pers. comm., Jan. 20, 2016.
- 54 Freeman et al., *Kentucky House Bill 1*.
- 55 House Bill 217, Kentucky Legislature (2013), <http://www.lrc.ky.gov/record/13rs/HB217.htm>; Prescription Drug Monitoring Program Center of Excellence, *COE Briefing—Mandating PDMP Participation*.
- 56 House Bill 1, Kentucky Legislature.
- 57 David Hopkins, "Mandatory Prescriber Use of the Kentucky All Schedule Prescription Electronic Report System (KASPER)" (presentation to the National Rx Drug Abuse Summit, Atlanta, GA, April 22-24, 2014), <http://www.slideshare.net/OPUNITE/pdmp-5-hopkins-dreyzehneroleary>; Kentucky Administrative Regulations, Title 201, 201 KAR 9:260, "Professional Standards for Prescribing and Dispensing Controlled Substances," <http://www.lrc.ky.gov/kar/201/009/260.htm>; "Gov. Beshear Signs HB 217, Makes Common Sense Improvements to Landmark Prescription Drug Abuse Bill," Governor Steve Beshear's Communications Office, March 5, 2013, <http://migration.kentucky.gov/newsroom/governor/20130305hb217.htm>.
- 58 Prescription Drug Monitoring Program Center of Excellence, *COE Briefing—Mandating PDMP Participation*.
- 59 Prescription Drug Monitoring Program Center of Excellence, *Mandating PDMP Participation by Medical Providers: Current Status and Experience in Selected States* (Waltham, MA: Brandeis University, February 2014), <http://healthienv.org/wp-content/uploads/2015/02/PDMP-Briefing.pdf>.
- 60 Prescription Drug Monitoring Program Center of Excellence, *COE Briefing—Mandating PDMP Participation*; House Bill 1, Kentucky Legislature.
- 61 Prescription Drug Monitoring Program Center of Excellence, *Mandating PDMP Participation in Kentucky*.
- 62 Prescription Drug Monitoring Program Center of Excellence, *COE Briefing—Mandating PDMP Participation*.
- 63 Van Ingram, executive director, Office of Drug Control Policy, Kentucky Justice and Public Safety Cabinet, "Prescription Drug Monitoring Programs and KASPER" (presentation to Community Anti-Drug Coalitions of America 25th Anniversary National Leadership Forum, Feb. 5, 2015, Gaylord National Hotel and Convention Center, National Harbor, MD); Van Ingram, pers. comm., May 2014.
- 64 Freeman et al., *Kentucky House Bill 1*.
- 65 Ibid.
- 66 Freeman et al., *Kentucky House Bill 1*.
- 67 Terence O'Leary, "Lessons Learned From Mandating Prescriber Compliance" (presentation to 2014 National Rx Drug Abuse Summit, Atlanta, GA, April 22-24, 2014), <http://nationalrxdrugabusesummit.org/presentations-2>; Anita Murray, deputy director of New York State Bureau of Narcotic Control, interviews and pers. comm., October and November 2015.
- 68 Bill No. S07637, New York State Assembly (2012), http://assembly.state.ny.us/leg/?default_fld=&bn=S07637&term=2011&Summary=Y&Actions=Y&Text=Y.
- 69 Prescription Drug Monitoring Program Center of Excellence, *COE Briefing—Mandating PDMP Participation*.
- 70 Prescription Drug Monitoring Program Center of Excellence, *COE Briefing—Mandating PDMP Participation*.
- 71 New York State Department of Health, unpublished data.
- 72 Ibid.
- 73 Joshua Vinciguerra, director, Bureau of Narcotic Enforcement, NY State Department of Health, "New York's PMP: Using Data to Prevent Opioid Overdose and Addiction" (presentation to Advancing Policy and Practice: A 50 State Convening to Prevent Opioid Overdose and Addiction, U.S. Department of Health and Human Services, Arlington, VA, Sept. 18, 2015).
- 74 Vinciguerra, "New York's PMP."
- 75 Prescription Drug Monitoring Program Center of Excellence, *COE Briefing—Mandating PDMP Participation*.
- 76 Hopkins, "Mandatory Prescriber Use."

- 77 Prescription Drug Monitoring Program Center of Excellence, *COE Briefing—Mandating PDMP Participation*; Hopkins, “Mandatory Prescriber Use”; Terence O’Leary, “Lessons Learned From Mandating Prescriber Compliance” (presentation to 2014 National Rx Drug Abuse Summit, Atlanta, GA, April 22-24, 2014), <http://nationalrxdrugabusesummit.org/presentations-2>.
- 78 Prescription Behavior Surveillance System, unpublished data.
- 79 National Alliance for Model State Drug Laws, *States That Require Prescribers and/or Dispensers to Access PMP Database*.
- 80 Ibid.
- 81 Prescription Drug Monitoring Program Center of Excellence, *COE Briefing—Mandating PDMP Participation*.
- 82 Chad Garner, director, Ohio Automated Rx Reporting System, pers. comm., Nov. 4, 2015.
- 83 Ohio Automated Rx Reporting System, *2015 Report*, https://www.ohiopmp.gov/portal/documents/2015_OARRS_Report.pdf.
- 84 Prescription Behavior Surveillance System, unpublished data.
- 85 Patricia Lapera and Susan Payne, “Using the Maine PMP to Improve Prescribing Practices for Potentially Addictive Prescription Medications” (presentation at the International Symposium on Safe Medicine, Portland, ME, Oct. 2-4, 2011), <http://benzos.une.edu/2011conference.htm>.
- 86 Code of Alabama, Title 20, Chapter 2, Article 10, § 20-2-214, <http://law.justia.com/codes/alabama/2006/17354/20-2-214.html>.
- 87 Prescription Drug Monitoring Program Center of Excellence, *COE Briefing: PDMP Delegate Account Systems* (Waltham, MA: Brandeis University, May 2015), <http://www.pdmpexcellence.org/sites/all/pdfs/COE%20Briefing%20on%20Delegate%20Account%20Systems.pdf>.
- 88 Clark et al., *Prescription Drug Monitoring Programs*.
- 89 Prescription Drug Monitoring Program Center of Excellence, *COE Briefing: PDMP Delegate Account Systems*.
- 90 National Alliance for Model State Drug Laws, *Penalty Provisions for Violations of Prescription Monitoring Program Privacy Protections* (November 2014), <http://www.namsdl.org/library/E2533609-C145-7BC4-A2DB606E1F4ED58B>.
- 91 Rutkow et al., “Most Primary Care Physicians.”
- 92 Public Health Connections, *Formative Research: Maine’s Prescription Monitoring Program* (Waterville, ME: Maine Office of Substance Abuse, April 2011), <http://www.maine.gov/dhhs/samhs/osa/data/pmp/files/FormativeResearch2011.pdf>.
- 93 Oregon Prescription Drug Monitoring Program, *2014 Annual Report to the PDMP Advisory Commission* (Portland, OR: Oregon Health Authority, January 2015), http://www.orpdmp.com/orpdmpfiles/PDF_Files/Reports/2014_PDMP-AC_Annual_Report_02_05_15.pdf.
- 94 Clark et al., *Prescription Drug Monitoring Programs*.
- 95 Prescription Drug Monitoring Program Training and Technical Assistance Center, *Implementing Best Practices: A Comparison of PDMP Changes 2010 to 2014* (Waltham, MA: Brandeis University, December 2015), accessed Feb. 3, 2016, http://www.pdmpassist.org/pdf/state_survey_comparisons_TAG_FINAL_20151222.pdf.
- 96 Survey conducted by Brandeis University PDMP Center of Excellence and The Pew Charitable Trusts from November to December 2015 for this report; see Appendix E: Status of Adoption of Evidence-Based Practices to Optimize Prescriber Use of PDMPs.
- 97 David Hopkins, program manager, Kentucky PDMP, pers. comm., July 2015.
- 98 Ibid.
- 99 David Hopkins, program manager, Kentucky PDMP, pers. comm., January 2016.
- 100 Freeman et al., *Kentucky House Bill 1*.
- 101 Dennis McCarty et al., “Oregon Strategy to Address Prescription Opioid Abuse: A Case Study,” *Journal of Substance Abuse Treatment* 48, no. 1 (2015): 91-95, <http://dx.doi.org/10.1016/j.jsat.2014.07.012>; Oregon Prescription Drug Monitoring Program, *2014 Annual Report to the PDMP Advisory Commission* (Portland, OR: Oregon Health Authority, January 2015), http://www.orpdmp.com/orpdmpfiles/PDF_Files/Reports/2014_PDMP-AC_Annual_Report_02_05_15.pdf.
- 102 Oregon Prescription Drug Monitoring Program, *2014 Annual Report*.
- 103 Oregon Health Authority, *Early Assessment*.
- 104 Deyo et al., “Leading a Horse to Water.”
- 105 Oregon Administrative Rule OAR 410-121-4000, Prescription Drug Monitoring Program, http://arcweb.sos.state.or.us/pages/rules/bulletin/0216_bulletin/0216_ch333_bulletin.html.

- 106 Oregon Prescription Drug Monitoring Program, "PDMP User's Guide," Oregon Health Authority, accessed June 4, 2016, www.orpdmp.com/orpdmpfiles/PDF_Files/2016/OR_PDMP_Healthcare_Providers_Guide.pdf.
- 107 Oregon Prescription Drug Monitoring Program, "Terms and Conditions of Account Use Agreement," Oregon Health Authority, accessed Feb. 11, 2016, http://www.orpdmp.com/orpdmpfiles/Terms&ConditionsofUse_v2.0.pdf.
- 108 Oregon Prescription Drug Monitoring Program, "PDMP User Access and Registration," Oregon Health Authority, accessed Feb. 11, 2016, <http://www.orpdmp.com/health-care-provider>.
- 109 Oregon Health Authority, *Prescription Drug Monitoring Quarterly Report, January–March 2014*, accessed Dec. 17, 2015, http://www.orpdmp.com/orpdmpfiles/PDF_Files/Reports/Jan-Mar2014QuarterlyPDMPrpt.pdf.
- 110 Oregon Health Authority, *Prescription Drug Monitoring Quarterly Report, July–September 2015*, accessed Dec. 17, 2015, <http://www.orpdmp.com/PDMP%20Quarterly%20Report.pdf>.
- 111 Oregon Prescription Drug Monitoring Program, *2014 Annual Report*.
- 112 Public Health Connections, *Maine's Prescription Monitoring Program*.
- 113 Maine Prescription Monitoring Program, "PMP Announcement," accessed Dec. 17, 2015, <http://www.maine.gov/dhhs/samhs/osa/data/pmp/files/PMPAnnouncement.pdf>.
- 114 Eleesa Marnagh and Helaine Hornby, *Prescription Monitoring Program Integration Project: Year Two Final Evaluation* (Augusta, ME: Maine Office of Substance Abuse and Mental Health Services, 2015), <http://www.maine.gov/dhhs/samhs/osa/data/pmp/files/PMP%20Evaluation%20Year%20Two%20FINAL%202015.pdf>.
- 115 John Lipovsky, Maine PMP Coordinator, pers. comm., January 2016.
- 116 Kate M. Dunn et al., "Opioid Prescriptions for Chronic Pain and Overdose," *Annals of Internal Medicine* 152, no. 2 (2010): 85–92, <http://dx.doi.org/10.7326/0003-4819-152-2-201001190-00006>; Gwira Baumblatt et al., "High-Risk Use by Patients Prescribed Opioids for Pain and Its Role in Overdose Deaths," *JAMA Internal Medicine* 174, no. 5 (2014): 796–801, <http://dx.doi.org/10.1001/jamainternmed.2013.12711>.
- 117 Thomas et al., "Prescriber Response"; Marcella Sorg, Sharon Labrie, and William Parker, "Analysis and Evaluation of Participation by Prescribers and Dispensers in the Maine State Prescription Monitoring Program," Margaret Chase Smith Policy Center, University of Maine (August 2009), http://digitalcommons.library.umaine.edu/cgi/viewcontent.cgi?article=1020&context=ant_facpub.
- 118 Survey conducted by Brandeis University PDMP Center of Excellence and The Pew Charitable Trusts from November to December 2015 for this report; see Appendix E: Status of Adoption of Evidence-Based Practices to Optimize Prescriber Use of PDMPs.
- 119 Laura Morgan et al., "The Use of Prescription Monitoring Programs to Reduce Opioid Diversion and Improve Patient Safety," *Journal of Pain & Palliative Care Pharmacotherapy* 27, no. 1 (2013): 4–9, <http://dx.doi.org/10.3109/15360288.2012.738288>.
- 120 Prescription Drug Monitoring Program Center of Excellence, *Identifying Probable Doctor Shopping and Other Questionable Activity Using Prescription Monitoring Data: Some Preliminary Findings* (Waltham, MA: Brandeis University, 2011).
- 121 Marty Allain, "User-Led Unsolicited Reporting (ULUR)" (presentation to the 2012 Harold Rogers Prescription Drug Monitoring Program National Meeting, Washington, DC, June 4–6, 2012), http://www.pdmpassist.org/pdf/PPTs/National2012/2_Allain_StatePanelInnovationsIndiana.pdf.
- 122 Prescription Drug Monitoring Program Center of Excellence, *Notes From the Field—Nevada's Proactive PDMP: The Impact of Unsolicited Reports* (Waltham, MA: Brandeis University, October 2011), http://www.pdmpassist.org/pdf/COE_documents/Add_to_TTAC/nevada_nff_10_26_11.pdf.
- 123 Prescription Drug Monitoring Program Center of Excellence, *Notes From the Field—Trends in Wyoming PDMP Prescription History Reporting: Evidence for a Decrease in Doctor Shopping?* (Waltham, MA: Brandeis University, September 2010), http://www.pdmpassist.org/pdf/COE_documents/Add_to_TTAC/NFF_wyoming_rev_11_16_10.pdf.
- 124 Sorg, Labrie, and Parker, "Analysis and Evaluation of Participation."
- 125 Nathaniel Katz et al., "Usefulness of Prescription Monitoring Programs for Surveillance: Analysis of Schedule II Opioid Prescription Data in Massachusetts, 1996–2006," *Pharmacoepidemiology and Drug Safety* 19, no. 2 (2010): 115–23.
- 126 B. L. Wilsey et al., "Profiling Multiple Provider Prescribing of Opioids, Benzodiazepines, Stimulants, and Anorexics," *Drug and Alcohol Dependence* 112, nos. 1–2 (2010): 99–106, <http://dx.doi.org/10.1016/j.drugalcdep.2010.05.007>.
- 127 Vincent Pradel et al., "Impact of a Prescription Monitoring Program on Doctor-Shopping for High Dosage Buprenorphine," *Pharmacoepidemiology and Drug Safety* 18, no. 1 (2009): 36–43, <http://dx.doi.org/10.1002/pds.1681>.
- 128 Centers for Disease Control, "What States Can Do to Reverse the PDO Epidemic," accessed March 9, 2016, <http://www.sa4docs.org/wp-content/uploads/2013/07/What-States-Can-Do-to-Reverse-the-PDO-Epidemic.pdf>.

- 129 Prescription Drug Monitoring Program Center of Excellence, *Guidance on PDMP Best Practices*.
- 130 Leonard Young, *Electronic Alerts for Prescribers: Massachusetts Prescription Monitoring Program Experience* (Waltham, MA: Brandeis University, February 2015), http://www.pdmpassist.org/pdf/COE_documents/Add_to_TTAC/MA%20PMP%20electronic%20alert%20NFF.pdf.
- 131 Survey conducted by Brandeis University PDMP Center of Excellence and The Pew Charitable Trusts from November to December 2015 for this report; see Appendix E: Status of Adoption of Evidence-Based Practices to Optimize Prescriber Use of PDMPs; National Alliance for Model State Drug Laws, *2015 Annual Review of Prescription Drug Monitoring Programs* (September 2015), <http://www.namsdl.org/library/1810E284-A0D7-D440-C3A9A0560A1115D7>.
- 132 Maine Department of Health and Human Services, "Rules Governing the Controlled Substances Prescription Monitoring Program," accessed March 9, 2016, <http://www.maine.gov/dhhs/samhs/osa/data/pmp/files/PMP%20Rules.pdf>.
- 133 John Lipovsky, Maine PMP coordinator, pers. comm., October 2015.
- 134 Ibid.
- 135 Ibid.
- 136 Prescription Drug Monitoring Program Center of Excellence, *PBSS Data Brief: Patient Risk Measures for Controlled Substance Prescriptions in Maine, 2010-2014* (Waltham, MA: Brandeis University, May 2015), https://www.cdc.gov/drugoverdose/pdf/pbss/mainepbsdatabriefmay15_official-version-a.pdf.
- 137 Prescription Drug Monitoring Program Center of Excellence at Brandeis University, "Prescription Behavior Surveillance System Surveillance Report: Maine, 2013," unpublished data.
- 138 Sorg, Labrie, and Parker, "Analysis and Evaluation of Participation."
- 139 Allain, "User-Led Unsolicited Reporting."
- 140 Chad Zadrazil, Wisconsin PDMP director, pers. comm., November 2015.
- 141 Allain, "User-Led Unsolicited Reporting."
- 142 Kooreman et al., "Indiana INSPECT Evaluation."
- 143 Amanda Garrett, Indiana PDMP staff, pers. comm., Sept. 1, 2016.
- 144 Allain, "User-Led Unsolicited Reporting."
- 145 Amanda Garrett and Nicholas Goodwin, Indiana PDMP staff, pers. comm., October 2015.
- 146 Ibid.
- 147 Taya Fernandez, Indiana PDMP staff, pers. comm., May 2016.
- 148 Massachusetts Department of Public Health, *The MA Prescription Monitoring Program: A Report to the Massachusetts Legislature* (Boston, MA: Massachusetts Health and Human Services, 2013), <http://www.mass.gov/eohhs/docs/dph/quality/drugcontrol/dph-pmp-legislative-report-2013.doc>.
- 149 Young, *Electronic Alerts*.
- 150 Leonard Young, Massachusetts PDMP staff, pers. comm., October 2015.
- 151 Leonard Young, Massachusetts PDMP staff, pers. comm., June 2015.
- 152 Leonard Young, "An Evaluation of the Impact of Providing Unsolicited 'Questionable Activity' Reports to Prescribers" (presentation to PDMP East Regional Meeting, Manchester, NH, Oct. 8-9, 2013, <http://www.pdmpassist.org/content/pdmp-east-regional-meeting>), http://www.pdmpassist.org/pdf/PPTs/East_2013/08_7_Young.pdf.
- 153 Young, *Electronic Alerts*.
- 154 Ibid.
- 155 Ibid.
- 156 Prescription Drug Monitoring Program Training and Technical Assistance Center, *PDMP Suggested Practices to Ensure Pharmacy Compliance and Improve Data Integrity* (Waltham, MA: Brandeis University, April 2015), http://www.pdmpassist.org/pdf/Pharmacy_compliance_data_quality_TAG_FINAL_20150615.pdf.
- 157 Jeanmarie Perrone and Lewis Nelson, "Medication Reconciliation for Controlled Substances: An 'Ideal' Prescription Drug Monitoring Program," *New England Journal of Medicine* 366, no. 25 (2012): 2341-43, <http://dx.doi.org/10.1056/NEJMp1204493>.
- 158 Robert J. Smith et al., "How, Why, and for Whom Do Emergency Medicine Providers Use Prescription Drug Monitoring Programs?" *Pain Medicine* 16, no. 6 (2015): 1122-31, <http://dx.doi.org/10.1111/pme.12700>.

- 159 “Developing a Five-Year Roadmap: A Roundtable on Optimizing State PDMPs from 2015 to 2020,” roundtable discussion, The Pew Charitable Trusts and Bureau of Justice Assistance, Atlanta, GA, April 6, 2015.
- 160 Don Vogt, program manager, Oklahoma PDMP, pers. comm., June 2016.
- 161 John Eadie, Prescription Drug Monitoring Program Center of Excellence at Brandeis University, unpublished data, 2010. Note: Data do not include West Virginia, which did not respond to the survey from which these data were derived.
- 162 Survey conducted by Brandeis University PDMP Center of Excellence and The Pew Charitable Trusts from November to December 2015 for this report; see Appendix E: Status of Adoption of Evidence-Based Practices to Optimize Prescriber Use of PDMPs.
- 163 Centers for Disease Control and Prevention, “Prevention Status Reports.”
- 164 Prescription Drug Monitoring Program Center of Excellence, *Oklahoma’s Pioneering PMP*.
- 165 Ibid.
- 166 Ibid.
- 167 Don Vogt, program manager, Oklahoma PDMP, pers. comm., October 2015; Tiffany Gibson, “Real-Time Reporting Law Could Cut Down on Prescription Abuse, Fraud, Oklahoma Officials Say,” *NewsOK*, Feb. 5, 2012, accessed Dec. 30, 2015, <http://newsok.com/article/3646147>.
- 168 Prescription Drug Monitoring Program Center of Excellence, *Oklahoma’s Pioneering PMP*.
- 169 Don Vogt, program manager, Oklahoma PDMP, “PMP Real-Time Reporting” (presentation to 2011 Harold Rogers Prescription Drug Monitoring Program National Meeting, June 7–9, 2011), <http://www.pdmpassist.org/pdf/PPTs/National2011/StatePanellInitiativesOK.pdf>.
- 170 Don Vogt, program manager, Oklahoma PDMP, pers. comm., October 2015.
- 171 Prescription Drug Monitoring Program Center of Excellence, *Oklahoma’s Pioneering PMP*.
- 172 Don Vogt, program manager, Oklahoma PDMP, pers. comm., October 2015.
- 173 Ibid.
- 174 Peter Kreiner, principal investigator of the Prescription Drug Monitoring Program Center of Excellence at Brandeis University, pers. comm., October 2015; survey conducted by Brandeis University PDMP Center of Excellence and The Pew Charitable Trusts from November to December 2015 for this report.
- 175 Don Vogt, program manager, Oklahoma PDMP, pers. comm., October 2015.
- 176 Ibid.
- 177 Patricia R. Freeman et al., *Study of Real-Time Prescription Monitoring Program (PMP) Data Collection for the Kentucky All Schedule Prescription Electronic Reporting (KASPER) Program* (Lexington, KY: University of Kentucky, Institute for Pharmaceutical Outcomes and Policy, June 2011), <http://www.pdmpassist.org/pdf/KASPER-Study%20of%20Real-Time%20Data%20Collection%20Report%20-%20Final-1.pdf>.
- 178 Kentucky Administrative Regulations, Title 902, 902 KAR 55:110, “Monitoring System for Prescription Controlled Substances,” <http://www.lrc.ky.gov/kar/902/055/110.htm>.
- 179 David Hopkins, program manager, Kentucky PDMP, pers. comm., September 2015.
- 180 Ibid.
- 181 Freeman et al., *Kentucky House Bill 1*.
- 182 David Hopkins, program manager, Kentucky PDMP, pers. comm., September 2015.
- 183 Stacey Pfennig, “The APRN Experience Using Prescription Drug Monitoring Programs” (presentation to 2015 National Council of State Boards of Nursing APRN Roundtable, Rosemont, IL, April 15, 2015), https://www.ncsbn.org/2015_APRN_SPfennig.pdf.
- 184 Clark et al., *Prescription Drug Monitoring Programs*.
- 185 Survey conducted by Brandeis University PDMP Center of Excellence and The Pew Charitable Trusts from November to December 2015 for this report; see Appendix E: Status of Adoption of Evidence-Based Practices to Optimize Prescriber Use of PDMPs.
- 186 National Alliance for Model State Drug Laws, *2015 Annual Review of Prescription Monitoring Programs* (September 2015), <http://www.namsdl.org/library/1810E284-AOD7-D440-C3A9A0560A1115D7>.
- 187 Heather Gray, National Alliance for Model State Drug Laws, pers. comm., Dec. 16, 2015.
- 188 State of Tennessee Public Chapter No. 88 (2012), <http://www.tn.gov/sos/acts/107/pub/pc0880.pdf>; Prescription Drug Monitoring Program Center of Excellence, *COE Briefing—Mandating PDMP Participation*.

- 189 D. Todd Bess and Debora Sanford, Tennessee PDMP staff, pers. comm., October 2015.
- 190 Ibid.
- 191 D. Todd Bess, Debora Sanford, Tennessee PDMP staff, pers. comm., October 2015.
- 192 Controlled Substance Monitoring Database Advisory Committee, *Controlled Substance Monitoring Database, 2014 Report to the 108th Tennessee General Assembly* (Nashville, TN: Tennessee Department of Health, February 2014), http://tn.gov/assets/entities/health/attachments/CSMD_AnnualReport_2014.pdf; Controlled Substance Monitoring Database Advisory Committee, *Report to the General Assembly: Controlled Substance Monitoring Database, A Report to the 2013 108th Tennessee General Assembly* (Nashville, TN: Tennessee Department of Health, February 2013), http://tn.gov/assets/entities/health/attachments/CSMD_AnnualReport_2013.pdf; Controlled Substance Monitoring Database Advisory Committee, *Controlled Substance Monitoring Database, 2015 Report to the 109th Tennessee General Assembly* (Nashville, TN: Tennessee Department of Health, February 2015), http://tn.gov/assets/entities/health/attachments/CSMD_AnnualReport_2015.pdf.
- 193 Controlled Substance Monitoring Database Advisory Committee, *Report to the General Assembly, 2013*.
- 194 Controlled Substance Monitoring Database Advisory Committee, *Controlled Substance Monitoring Database, 2014*.
- 195 Barbara Carter, Minnesota PMP manager, pers. comm., October 2015.
- 196 Ibid; Barbara Carter, "Minnesota Prescription Monitoring Program" (presentation at 2013 North Regional Meeting, Prescription Drug Monitoring Program Training and Technical Assistance Center and Bureau of Justice Assistance, St. Louis, MO, April 23-24, 2013), http://www.pdmpassist.org/pdf/PPTs/North_2013/8_Grant_Activities_Carter.pdf.
- 197 Barbara Carter, Minnesota PMP manager, pers. comm., October 2015.
- 198 Carter, "Minnesota Prescription."
- 199 Barbara Carter, Minnesota PMP manager, pers. comm., October 2015.
- 200 Massachusetts Executive Office of Health and Human Services, "Guidance on MA Online PMP Automatic Enrollment," accessed Dec. 15, 2015, <http://www.mass.gov/eohhs/gov/departments/dph/programs/hcq/drug-control/mcsr/pmp-automatic-enrollment.html>.
- 201 Massachusetts Controlled Substances Act, Section 7A, "Registration as Participant in Prescription Monitoring Program," accessed Dec. 14, 2015, <https://malegislature.gov/Laws/GeneralLaws/PartI/TitleXV/Chapter94C/Section7A>.
- 202 Deborah Allwes and Jonathan Mundy, *The Massachusetts Prescription Monitoring Program: A Report to the Massachusetts General Court* (Boston, MA: Massachusetts Department of Public Health, February 2015), <http://www.mass.gov/eohhs/docs/dph/quality/drugcontrol/dph-pmp-report-final-2-12-15.pdf>.
- 203 Leonard Young, epidemiologist, Massachusetts Department of Public Health, pers. comm., October 2015.
- 204 Ibid.
- 205 Kreiner, Nikitin, and Shields, "Bureau of Justice Assistance." As noted in this report, "Prescriber registration rates are measured as the ratio of (1) the cumulative number of prescribers registered to use the PDMP by the end of the reporting period and (2) the total number of licensed prescribers who issued one or more controlled substance prescriptions during the reporting period."
- 206 Allwes and Mundy, *Massachusetts Prescription Monitoring Program*.
- 207 Survey conducted by Brandeis University PDMP Center of Excellence and The Pew Charitable Trusts from November to December 2015 for this report.
- 208 Leonard Young, epidemiologist, Massachusetts Department of Public Health, pers. comm., January 2016.
- 209 Leonard Young, epidemiologist, Massachusetts Department of Public Health, pers. comm., October 2015.
- 210 Prescription Drug Monitoring Program Center of Excellence, Nevada's Proactive PDMP.
- 211 Kreiner, Nikitin, and Shields, "Bureau of Justice Assistance."
- 212 Survey conducted by Brandeis University PDMP Center of Excellence and The Pew Charitable Trusts from November to December 2015 for this report; see Appendix E: Status of Adoption of Evidence-Based Practices to Optimize Prescriber Use of PDMPs.
- 213 Ibid.
- 214 Maine Department of Health and Human Services and Substance Abuse and Mental Health Services, "Prescription Monitoring Program: An Overview of Maine's PMP" (July 2015), <http://www.maine.gov/dhhs/samhs/osa/data/pmp/index.htm>.
- 215 Partnership for Drug-Free Kids, "The Medicine Abuse Project 2015 Report," accessed June 3, 2016, http://medicineabuseproject.org/assets/documents/MAP_2015_E-Report_final_opt.pdf.
- 216 Marnagh and Hornby, *Prescription Monitoring Program*.

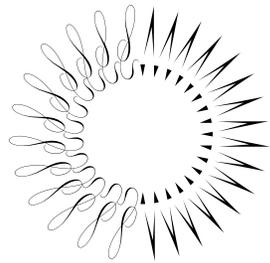
- 217 Public Health Connections, *Maine's Prescription Monitoring Program*.
- 218 Hornby Zeller Associates Inc., *2013 Prescription Monitoring Program Survey Results* (August, ME: Maine Office of Substance Abuse and Mental Health Services, July 2013), <http://www.maine.gov/dhhs/samhs/osa/pubs/data/2013/PMPSurveyResultsFINALJul2013.pdf>.
- 219 Marnagh and Hornby, *Prescription Monitoring Program*.
- 220 Sorg, Labrie, and Parker, "Analysis and Evaluation of Participation."
- 221 Public Health Connections, *Maine's Prescription Monitoring Program*.
- 222 "Academic Detailing, Maine Independent Clinical Information Service," Maine Medical Association, accessed June 3, 2016, <https://www.mainemed.com/MICIS>.
- 223 John Lipovsky, Maine Prescription Monitoring Program coordinator, pers. comm., Jan. 19, 2016.
- 224 Florida Health, *Electronic-Florida Online Reporting of Controlled Substances Evaluation, 2014-2015 Prescription Drug Monitoring Program Annual Report* (Tallahassee, FL: Florida Department of Health, December 2015), http://www.floridahealth.gov/statistics-and-data/e-forcse/news-reports/_documents/2015-pdmp-annual-report.pdf.
- 225 Erika Marshal, program operations administrator, Florida PDMP, pers. comm., October 2015.
- 226 Bureau of Justice Assistance, "Awards Made for 'BJA FY 09 Harold Rogers Prescription Drug Monitoring Program: Implementation,'" accessed Dec. 22, 2015, <https://external.ojp.usdoj.gov/selector/title?solicitationTitle=BJA%20FY%2009%20Harold%20Rogers%20Prescription%20Drug%20Monitoring%20Program:%20Implementation&po=BJA>.
- 227 Florida PDMP, pers. comm., October 2015.
- 228 Ibid.
- 229 Florida Health, *Electronic-Florida, 2014-2015*.
- 230 Ibid.
- 231 Florida Department of Health, *Electronic-Florida Online Reporting of Controlled Substances Evaluation, 2011-2012 Prescription Drug Monitoring Program Annual Report* (December 2012), http://www.floridahealth.gov/statistics-and-data/e-forcse/news-reports/_documents/2011-2012pdmp-annual-report.pdf.
- 232 Florida Health, *Electronic-Florida, 2014-2015*.
- 233 Florida Health, *Electronic-Florida, 2011-2012*.
- 234 Ibid.
- 235 Rebecca Poston, program director, Florida PDMP, pers. comm., June 2016.
- 236 Anita Murray, deputy director, New York State Department of Public Health Bureau of Narcotic Enforcement, interview on Oct. 22, 2015, with John Eadie of the PDMP Center of Excellence.
- 237 Anita Murray, assistant director, New York State Department of Public Health Bureau of Narcotic Enforcement, "Recent Changes to New York's Controlled Substances Act" (presentation to meeting of NY Chapter of the American College of Physicians, Syracuse, NY, May 7, 2013); Anita Murray, interview with John Eadie.
- 238 Anita Murray, assistant director, New York State Department of Public Health Bureau of Narcotic Enforcement (presentation to students, faculty, and practicing pharmacists for Law Day at Albany College of Pharmacy and Health Sciences, Albany, NY, Nov. 10, 2013).
- 239 Anita Murray, interview with John Eadie.
- 240 Ibid.
- 241 Ibid.
- 242 Ibid.
- 243 Mitre Corp., Office for the National Coordinator for Health Information Technology, and the Substance Abuse and Mental Health Services Administration, *Connecting for Impact: Integrating Health IT and PDMPs to Improve Patient Care* (Washington, DC: U.S. Department of Health and Human Services, 2013), https://www.healthit.gov/sites/default/files/connecting_for_impact-final-508.pdf.
- 244 Clark et al., *Prescription Drug Monitoring Programs*; Mitre Corp., *Enhancing Access to Prescription Drug Monitoring Programs Using Health Information Technology: Work Group Recommendations* (Washington, DC: U.S. Department of Health and Human Services, August 2012), https://www.healthit.gov/sites/default/files/work_group_document_integrated_paper_final_0.pdf.
- 245 Hildebran et al., "How Clinicians Use."
- 246 Mitre Corp., *Enhancing Access*; Deyo et al., "Interstate Cooperation."

- 247 Tamara M. Haegerich et al., "Improving Injury Prevention Through Health Information Technology," *American Journal of Preventive Medicine* 48, no. 2 (2015): 219-28, <http://dx.doi.org/10.1016/j.amepre.2014.08.018>.
- 248 Mitre Corp., Office for the National Coordinator for Health Information Technology, and the Substance Abuse and Mental Health Services Administration, *Connecting Prescribers and Dispensers to PDMPs Through Health IT: Six Pilot Studies and Their Impact* (Washington, DC: U.S. Department of Health and Human Services, 2012), https://www.healthit.gov/sites/default/files/pdmp_pilot_studies_summary.pdf.
- 249 Mitre Corp., *Connecting Prescribers*; Mitre Corp. et al., *Connecting for Impact*.
- 250 Mitre Corp. et al., *Connecting for Impact*.
- 251 Mitre Corp., Office for the National Coordinator for Health Information Technology, and the Substance Abuse and Mental Health Services Administration, *Integrating an Emergency Department With a Prescription Drug Monitoring Program: A Pilot Study* (Washington, DC: U.S. Department of Health and Human Services, 2012), https://www.healthit.gov/sites/default/files/indiana-1_pdmp_pilot_study_0.pdf.
- 252 Christopher A. Griggs, Scott G. Weiner, and James A. Feldman, "Prescription Drug Monitoring Programs: Examining Limitations and Future Approaches," *Western Journal of Emergency Medicine* 16, no. 1 (2015): 67-70, <http://dx.doi.org/10.5811/westjem.2014.10.24197>.
- 253 Baumgartner, "Improving Utilization of PDMPs."
- 254 State of Ohio Board of Pharmacy, "Frequently Asked Questions: OARRS Integration," last updated Oct. 26, 2015, <https://www.ohiopmp.gov/Portal/Documents/IntegrationFAQ.pdf>.
- 255 Clark et al., *Prescription Drug Monitoring Programs*.
- 256 Mitre Corp. et al., *Connecting for Impact*.
- 257 Ibid.
- 258 Chris Baumgartner, "Improving Utilization of PDMPs" (presentation to the National Rx Drug Abuse Summit, Atlanta, GA, April 6-9, 2015), <http://www.slideshare.net/OPUNITE/rx15-pdmp-tues11151adamsdrozryan2baumgartner>; Carl Flansbaum, "New Mexico PMP: Health IT System Integration Update" (presentation at the West Regional Meeting, Salt Lake City, UT, Aug. 12-13, 2014), <http://www.pdmpassist.org/content/2014-west-regional-meeting>; Centers for Medicare and Medicaid Services, "Electronic Health Records (EHR) Incentive Programs," accessed March 10, 2016, https://www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/index.html?redirect=/EHRIncentivePrograms/01_Overview.asp.
- 259 Survey conducted by Brandeis University PDMP Center of Excellence and The Pew Charitable Trusts from November to December 2015 for this report; see Appendix E: Status of Adoption of Evidence-Based Practices to Optimize Prescriber Use of PDMPs.
- 260 Office of the National Coordinator for Health Information Technology, "Use of Health Information Technology to Optimize Provider Access and Use of Prescription Monitoring Information," accessed March 10, 2016, https://www.healthit.gov/sites/default/files/asp_a_0126_onc_fs_pdmp_rx_misuse_project.pdf.
- 261 Substance Abuse and Mental Health Services Administration, "FY 2012 SAMHSA Grant Awards," last updated Oct. 9, 2012, http://media.samhsa.gov/grants/2012/awards/ti_12_011.aspx; Substance Abuse and Mental Health Services Administration, "FY 2013 SAMHSA Grant Awards," last updated Nov. 19, 2013, http://media.samhsa.gov/grants/2013/awards/ti_13_013.aspx.
- 262 Arthur L. Kellermann and Spencer S. Jones, "What It Will Take to Achieve the as-Yet-Unfulfilled Promises of Health Information Technology," *Health Affairs* 32, no. 1 (2013): 62-68, <http://dx.doi.org/10.1377/hlthaff.2012.0693>.
- 263 David Gans, John Kralewski, Terry Hammons, and Bryan Dowd, "Medical Groups' Adoption of Electronic Health Records and Information Systems," *Health Affairs* 24, no. 5 (2005): 1323-33, <http://dx.doi.org/10.1377/hlthaff.24.5.1323>.
- 264 Anol Bhattacharjee and Neset Hikmet, "Physicians' Resistance Toward Healthcare Information Technology: A Theoretical Model and Empirical Test," *European Journal of Information Systems* 16 (2007): 725-37, <http://dx.doi.org/10.1057/palgrave.ejis.3000717>.
- 265 Ibid.
- 266 Ibid.
- 267 Ibid.
- 268 Ibid.
- 269 Mitre Corp. et al., *Integrating an Emergency Department*.
- 270 Mitre Corp. et al., *Connecting for Impact*.
- 271 Ibid.
- 272 Appriss, "NARxCHECK: Eliminate the Prescription Drug Abuse Epidemic," accessed Dec. 15, 2015, http://www.appriss.com/static/sitedocs/NarxCheck_ProductSheet.pdf.

- 273 Baumgartner, "Improving Utilization of PDMPs"; OneHealthPort, "OneHealthPort HIE," accessed March 10, 2016, <http://www.onehealthport.com/about-onehealthport-health-information-exchange>.
- 274 Washington State Department of Health, *Providing Seamless Access to the Prescription Drug Monitoring Program: Utilizing the Health Information Exchange and Electronic Medical Records* (October 2014), <http://www.pdmpassist.org/pdf/PMP%20White%20Paper%20HCO%20Final%2020141103.pdf>.
- 275 Washington State Department of Health, *Providing Seamless Access*.
- 276 Substance Abuse and Mental Health Services Administration, "FY 2012 SAMHSA Grant Awards."
- 277 Chris Baumgartner, PMP director, pers. comm., January 2016.
- 278 Baumgartner, "Improving Utilization of PDMPs."
- 279 Ibid; OneHealthPort, *Canonical Guide: Prescription Monitoring Program (PMP) Medication History* (July 17, 2014), http://www-old.onehealthport.com/sites/default/files/hie/CanonicalGuide_PMP.pdf.
- 280 Chris Baumgartner, PMP director, pers. comm., January 2016.
- 281 Washington State Health Care Authority, *Emergency Department Utilization: Update on Assumed Savings from Best Practices Implementation* (March 20, 2014), http://app.leg.wa.gov/ReportsToTheLegislature/Home/GetPDF?fileName=HCAReport_3ESH2127_EmergencyDeptUtilization_ae99b680-c5be-4788-a9a3-91537bdc555d.pdf.
- 282 Chris Baumgartner, PMP director, pers. comm., January 2016.
- 283 Baumgartner, "Improving Utilization of PDMPs."
- 284 Ibid.
- 285 Chris Baumgartner, PMP director, pers. comm., January, 2016.
- 286 David Hopkins, program manager, Kentucky PDMP, peer review comm., October 2015.
- 287 Survey conducted by Brandeis University PDMP Center of Excellence and The Pew Charitable Trusts from November to December 2015 for this report; see Appendix E: Status of Adoption of Evidence-Based Practices to Optimize Prescriber Use of PDMPs.
- 288 James Mielo, "Innovations in Prescription Monitoring" (webinar for the Prescription Drug Monitoring Program Training and Technical Assistance Center, Aug. 17, 2015), <http://www.pdmpassist.org/content/events>; James Mielo, New Jersey PDMP administrator, pers. comm., Jan. 6, 2016.
- 289 Ibid.
- 290 Ibid.
- 291 Ibid.
- 292 Ibid.
- 293 Ibid.
- 294 Ibid.
- 295 Mitre Corp. et al., *Integrating an Emergency Department*.
- 296 Mitre Corp. et al., *Connecting for Impact.*; Joshua Bolin, associate executive director, National Association of Boards of Pharmacy, pers. comm., Jan. 4, 2016.
- 297 Joshua Bolin, associate executive director, National Association of Boards of Pharmacy, pers. comm., Jan. 4, 2016.
- 298 Michael Small, program manager, California PDMP, telephone interview, Oct. 16, 2015, and subsequent pers. comm.
- 299 Sarah Varney, "Prescription Drug Monitoring Program Facing Cuts," *The California Report*, Feb. 14, 2012, <http://audio.californiareport.org/archive/R201202140850/a>.
- 300 Michael Small, program manager, California PDMP, pers. comm., Dec. 28, 2015.
- 301 State of California Department of Justice, "Attorney General Kamala D. Harris."
- 302 California Department of Justice, "CURES 2.0: Prescription Drug Monitoring Program" (presentation September 2015).
- 303 Michael Small, program manager, California PDMP, pers. comm., Jan. 15, 2016.
- 304 Ibid.

- 305 Bureau of Justice Assistance, "Awards Made for 'BJA FY 15 Harold Rogers Prescription Drug Monitoring Program: PDMP Practitioner and Research Partnerships,'" accessed Dec. 9, 2015, <https://external.ojp.usdoj.gov/selector/title?solicitationTitle=BJA%20FY%2015%20Harold%20Rogers%20Prescription%20Drug%20Monitoring%20Program:%20PDMP%20Practitioner%20and%20Research%20Partnerships&po=BJA>.
- 306 Griggs, Weiner, and Feldman, "Examining Limitations."
- 307 Prescription Drug Monitoring Program, Training and Technical Assistance Center, "PDMP Reports Available to Prescribers," last updated Nov. 16, 2015, http://www.pdmpassist.org/pdf/Prescribers_Available_Reports.pdf.
- 308 Carlena Orosco, "The Arizona Rx Drug Misuse and Abuse Initiative: A Multi-Systemic Approach for Addressing Arizona's 'Silent Epidemic'" (presentation to BJA National Meeting on Data Driven Multi-Disciplinary Approaches to Reducing Rx Abuse, Washington, DC, Feb. 25, 2015), http://www.pdmpassist.org/pdf/PPTs/DataDrivenPilots/Arizona_2015_Project_Introduction.pdf.
- 309 Prescription Drug Monitoring Program Center of Excellence, *Using PDMP Data*.
- 310 Prescription Drug Monitoring Program Training and Technical Assistance Center, "Oregon: Jackson County Data Driven Medico-Justice Practice Improvement," accessed March 9, 2016, <http://www.pdmpassist.org/content/oregon-%E2%80%93-jackson-county-data-driven-medico-justice-practice-improvement>.
- 311 Allwes and Mundy, *Massachusetts Prescription Monitoring Program*.
- 312 Anita Murray, deputy director, Bureau of Narcotic Enforcement, New York State Department of Health, pers. comm., October 2015.
- 313 Prescription Drug Monitoring Program Center of Excellence, "Project Lazarus"; Su Albert et al., "Project Lazarus: Community-Based Overdose Prevention in Rural North Carolina," *Pain Medicine* 12, supplement 2 (June 2011): S77-85, <http://dx.doi.org/10.1111/j.1526-4637.2011.01128.x>.
- 314 Prescription Drug Monitoring Program Training and Technical Assistance Center, "PDMP Mandatory Enrollment"; Prescription Drug Monitoring Program Training and Technical Assistance Center, "PDMP Mandatory Query."
- 315 "National Alliance for Model State Drug Laws," *States That Require Prescribers and/or Dispensers to Access PMP Database*.
- 316 Deyo et al., "Leading a Horse to Water."
- 317 Prescription Drug Monitoring Program Training and Technical Assistance Center, "PDMP Mandatory Training of Prescribers and Dispensers," last updated July 1, 2015, http://www.pdmpassist.org/pdf/Mandatory_Training.pdf; Prescription Drug Monitoring Program Training and Technical Assistance Center, "Engaged in Sending Solicited and Unsolicited Reports to Dispensers," last updated July 22, 2015, http://www.pdmpassist.org/pdf/Dispensers_Sol_Unsol_Reports.pdf.
- 318 Welsey Sargent, Centers for Disease Control and Prevention, pers. comm., October 2015.

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