Integrating & Expanding Prescription Drug Monitoring Program Data:

Lessons from Nine States



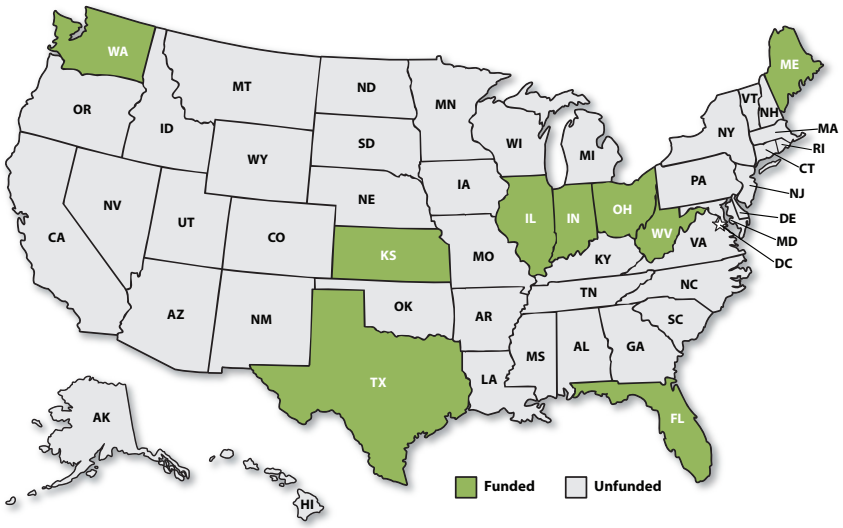
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National Center for Injury Prevention and Control
Division of Unintentional Injury Prevention

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A promising strategy for addressing the prescription opioid overdose epidemic is improving the use of prescription drug monitoring programs (PDMPs). PDMPs are state-run databases that collect patient-specific prescription information at the point of dispensing. Data are transmitted to a central repository where, in most states, authorized users such as medical professionals, public health agencies, regulatory bodies, and law enforcement agencies may access them. Many states have promoted use of PDMPs by registered prescribers and dispensers to inform their clinical decisions and allow for intervention at the point of care. However, PDMP data that have not been well integrated into health information technology (HIT) systems at the point of care for efficient workflow, coupled with limited data sharing across states, have slowed adoption of PDMP use among health care professionals who prescribe and dispense prescription opioids.

To increase use of PDMPs and to effectively reduce prescription opioid misuse and overdose, the Substance Abuse and Mental Health Services Administration (SAMHSA) funded projects in nine states from fiscal years 2012 to 2016 through its PDMP Electronic Health Records (EHRs) Integration and Interoperability Expansion (PEHRIIE) program. The project states were: Florida, Illinois, Indiana, Kansas, Maine, Ohio, Texas, Washington State, and West Virginia.



The goals of the PEHRIIE program were to:

1. Integrate PDMP reports into health information technologies (HITs) such as health information exchanges (HIE), electronic health record (EHR) systems, and/or pharmacy dispensing software (PDS) systems, thus streamlining provider access; and
2. Improve the comprehensiveness of PDMP reports by initiating or increasing interstate PDMP data exchange.



Successful achievement of these goals is expected to increase use of PDMPs, contributing to higher-quality clinical decision-making, in turn leading to improved clinical outcomes, such as reduced levels of inappropriate prescribing of opioids and decreases in overdoses involving prescription opioids.

The Centers for Disease Control and Prevention (CDC) conducted a process and outcome evaluation of the PEHRIIE program. CDC, in collaboration with Brandeis University, used a comparative case study design to describe the implementation process, identify successes and challenges, and explore the program's effects on the two goals. The evaluation used a mixed-methods approach by using qualitative interviews with state stakeholders, program document review, and quantitative PDMP data. This report summarizes (1) state-specific accomplishments related to integration and interstate data sharing and (2) design and implementation lessons learned across the nine states.

State Accomplishments

FIGURE 1: STATE ACTIVITIES AND ACCOMPLISHMENTS

State	PEHRIIE Activities and Major Successes as of January 2016	
	Integration	Interstate Data Sharing
Florida	Planned integration with all pharmacies in Florida operated by Florida Department of Health and Bureau of Statewide Pharmacy Services, all Community Health Departments in Florida, and into the Tampa General Hospital Emergency Department.	Florida providers can access data from other states, if permitted by those states PDMP.[1] Initiated "one-way" data sharing with Alabama in 2016—Florida will begin receiving PDMP data from Alabama by October 2016.
Illinois	Completed integration with EHR at Anderson Hospital, which was associated with decreased prescribing of opioids.	Initiated interstate data sharing. Sharing and receiving PDMP data with 18 states.
Indiana	Completed integration with Indiana HIE and Michiana Health Information Network in January 2013;[2] Integration included NARxCHECK[3] risk summary tool.	Expanded interstate data sharing. Sharing and receiving PDMP data with 20 states.
Kansas	Completed integration with Via Christi Health Network and Lewis And Clark Information Exchange, a statewide HIE. Integration with Kroger pharmacies (though not a part of PEHRIIE) included NARxCHECK risk summary tool.	Initiated interstate data sharing. Sharing and receiving PDMP data with 24 states.
Maine	Completed integration with statewide HIE, Maine Health Information Network. Link to PDMP embedded in selected pharmacies' intranets.	Expanded interstate data sharing. Sharing and receiving PDMP data with 2 states.
Ohio	Completed integration with MetroHealth EHR system and all Ohio Kroger pharmacies. Integration included NARxCHECK risk summary tool.	Expanded interstate data sharing. Sharing and receiving PDMP data with 17 states.
Texas	Planned integration with statewide HIETexas; planned pilot integration with EHR.	Planned expansion of interstate data sharing via a national PDMP hub (fall 2016). Texas is connected to the eHealth Exchange, which has participants in all 50 states.
Washington State	Completed integration with Emergency Department Information Exchange, a hub connecting hospital emergency departments.	Began pursuing interstate data sharing with regional neighbors. Sharing and receiving PDMP data with 0 states.
West Virginia	Planned pilot integration with West Virginia University Healthcare EHR system and completed integration with Kroger pharmacies. Kroger pharmacies integration included the NARxCHECK risk summary tool.	Initiated interstate data sharing. Sharing and receiving PDMP data with 10 states.

Figure 1- Describes the integration and data sharing accomplishments by state; ***Integration*** *is the inclusion of PDMP data into EHRs, PDS systems, and HIEs through automated queries;* ***Interstate Data Sharing*** *is the exchanging of PDMP data across state boundaries through bidirectional queries.*

[1] By state law, Florida is not permitted to share PDMP data with other states, though Florida may receive data from any state willing to make their PDMP data available to Florida end users.

[2] Both HIE integrations were later suspended in 2015, due to concerns about privacy/security. Usage data suggest that integration at MHIN did not have a positive effect on PDMP usage.

[3] NARxCHECK is an add-on feature for EHRs when querying the PDMP. It uses a proprietary algorithm to calculate a relative overdose risk score for a given patient based on their PDMP records. This score is then displayed in an EHR to help the provider quickly decide whether to review the patient's full PDMP record before prescribing a controlled substance.

Integration Summary

As noted in Figure 1, eight of the nine funded states were able to launch some integration and interoperability program activities prior to September 2015. Five of the states had integrated PDMP reports into statewide or local PDS systems, HIEs, or EHRs, and for three of these states—Kansas, Washington, and Illinois—possible effects were examined due to availability of data and reporting structure.[4]





Kansas was able to integrate PDMP reports with the Via Christi Health Network in October 2013. Following the integration, solicited reports[5] provided to Via Christi prescribers increased more than sevenfold, from 31,156 reports in 2013 to 223,000 reports in 2015. By comparison, the number of solicited reports provided to statewide prescribers (not including Via Christi prescribers) increased 182% from 23,171 in 2013 to 65,242 in 2015.



Washington's PDMP became interoperable with OneHealthPort, a statewide HIE, enabling integration with the Emergency Department Information Exchange (EDIE), a hub connecting hospital emergency departments, in late November 2014. In calendar year 2014 the PDMP provided 26,546 solicited reports to prescribers via EDIE. This number increased more than 80-fold to 2,222,446 EDIE reports in calendar year 2015.



Illinois achieved PDMP integration into EHRs at Anderson Hospital beginning in June 2013 as a result of an earlier pilot project with the Office of the National Coordinator (ONC) for Health Information Technology and SAMHSA. The integration transitioned to an OpenESB (Open Enterprise Service Bus) connection in April 2014, facilitating a much more cost-effective solution. Evidence suggests the greatly increased availability of PDMP reports via EHR integration at Anderson was associated with decreased prescribing of opioids. Notably:

- Solicited reports at the hospital provided to prescribers increased from an average of 6.9 reports per prescriber registered with the PDMP in 2013 to 998.2 reports per registered prescriber in 2015, a 145-fold increase.
- Solicited reports per registered prescriber statewide increased only slightly during the same period, from 7.26 in 2013 to 9.27 in 2015.
- There was a 22% decrease in the number of opioid prescriptions issued by Anderson prescribers from 2013 to 2015, versus a 13% increase in opioid prescriptions during that period for the state as a whole.
- There was a 41% decrease in the number of patients who received at least one opioid prescription from Anderson prescribers during the same period, compared with a 1% increase in such patients for the state as a whole.

[4] Some states were unable to distinguish requests from implementation sites versus other sites.

[5] Solicited reports are PDMP reports that are requested from end users. The requests or queries originate from within the PDMP or through an integrated connection to the PDMP. By comparison, unsolicited reports are PDMP reports that are sent in the absence of a request or query; the receiver of an unsolicited report may or may not be logged inside the PDMP system. Unsolicited reports may be sent via U.S. mail, email, or fax, since the receiver may not even be registered with the PDMP.

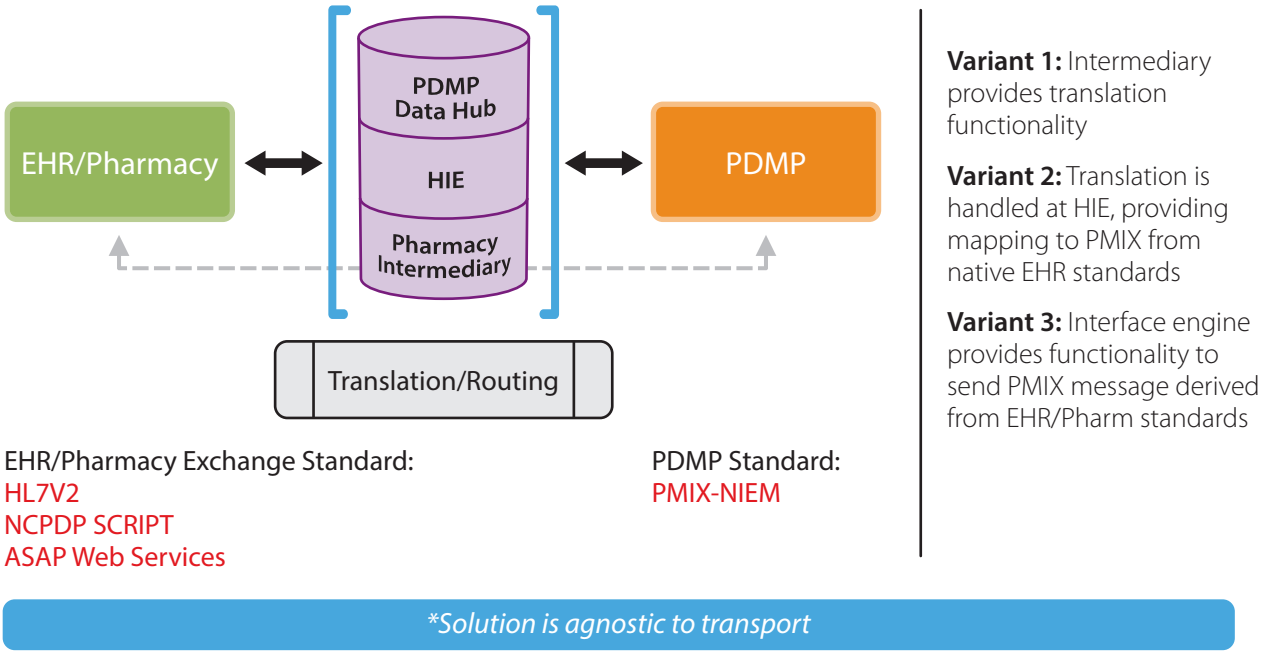
State Approaches for Connecting Data to Health Information Technologies

States took a range of approaches for connecting data to Health Information Technologies (HITs)—through a pharmacy intermediary (e.g., DrFirst, Surescripts) or a "gateway" (data translation software such as an application program interface service), or through a hub (in the case of interstate data exchange). Specific examples are described below.

- Indiana, Kansas, Maine, and Washington State used a state or regional HIE, managed by a state or private vendor, to route PDMP requests and responses.
- In Illinois, the data remained hosted within the PDMP, but direct linkages from the PDMP to EHRs were established so that end users could request data through a portal within their EHRs or directly via the web.
- Some states connected their PDMPs to hubs to help facilitate interstate PDMP data sharing. Florida, Illinois, Kansas, and West Virginia created PDMP/EHR and PDS integration by connecting the state to a PDMP hub (e.g., PMPi, RxCheck). Since Ohio and Indiana connected to the PMPi data hub and Maine connected to the RxCheck data hub prior to the PEHRIIE project, their focus was on expanding interstate data exchange connections. Both Maine and Texas have executed a memorandum of understanding with that National Association of Boards of Pharmacy (NABP) to join the PMPi data hub.

Figure 2 shows a general approach taken by states in establishing integration of PDMP data with EHRs and PDS systems.

FIGURE 2: EHR, PHARMACY, AND PDMP INTEGRATION



Source: Office of the National Coordinator (ONC) for Health Information Technology and SAMHSA. Available at: http://wiki.siframework.org/file/detail/Finalized+Solution+Plan.pptx

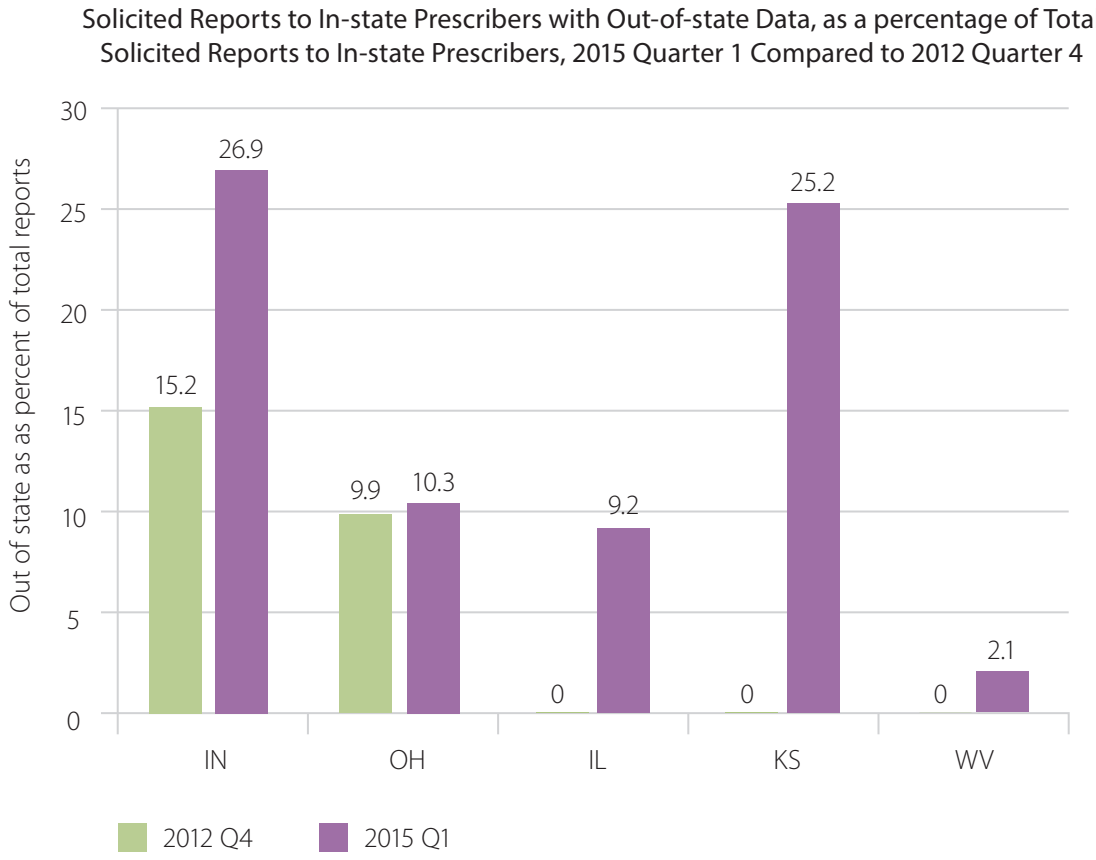
Interstate Data Sharing Summary

Six of the nine states initiated interstate data sharing by the first quarter of 2015. In five of these six states, this project component made an important contribution to increased provider usage of the PDMP. The vast majority of opioid prescriptions filled in each state originates in either the focal state or its immediate neighboring states.

- Illinois, Kansas, and West Virginia initiated two-way interstate data exchange as part of the project and achieved exchanges with three-quarters of available border states.
- Indiana and Ohio expanded interstate data exchange during the project and achieved exchanges with an average of 90% of available border states—double the percentage at the start of the project.

In the two states that initiated interstate data sharing by the project's start, sharing expanded at a faster rate than the overall expansion in solicited reports to in-state providers. These states, along with the three states that initiated interstate data sharing, are shown in the chart below, which displays changes in solicited reports to in-state prescribers with out-of-state data, as a percentage of total solicited reports to in-state prescribers. Solicited reporting increased from 15.2% to 26.9% in Indiana and a slight increase was observed in Ohio (9.9% to 10.3%). For Illinois, Kansas, and West Virginia, solicited reporting increased from zero in the fourth quarter 2012 to 9.2%, 25.2%, and 2.1% respectively in the first quarter of 2015.

FIGURE 3: SOLICITED REPORTS FROM PDMPS



Lessons Learned for Improving PDMP Data Sharing Within and Across States

Through implementation of activities aimed at enhancing PDMPs and increasing interstate data sharing, PEHRIIE funded states identified lessons learned as well as common features that characterize robust programs. This information can be shared with other states as a strategy for supporting work that increases adoption of PDMP use among prescribers and dispensers across the country. Key lessons are organized into design and implementation components and are summarized in Figure 4, below. Additional details on the key lessons are provided in the Program Design-Key Lessons section, located on the following page.

FIGURE 4: KEY LESSONS

Program Area	Key Lesson for Success	Description
Design	Learn from the field	Learn from other states' experiences with interstate data sharing and, where applicable, PDMP integration with HIT. Learn from vendors' experiences in working with HIT and with PDMP interoperability in other states.
	Start small, then expand	Build upon earlier PDMP interoperability pilot projects. Integrate PDMP data with individual EHR systems or HIEs first, before expanding statewide.
	Consider state context	Know the legal and technical environment. Leverage existing infrastructure, including existing HIEs, and identify potential barriers.
	Engage stakeholders early and often	Create stakeholder committees at design phase, including coordination across state agencies, providers and vendors; communicate often. Seek to identify and address stakeholder concerns. Work with multi-state vendors where possible; HIT vendors and pharmacies working across states may improve efficiency.
	Design a mechanism for monitoring progress	Document and monitor progress to support success of current and future projects. Ensure agency-level engagement to avoid delays with potential personnel and agency transitions.
Implementation	Ensure effective leadership and partner buy-in	Ensure leadership and priority setting from governor's office or high level at health systems' partners to help develop and maintain key stakeholder involvement.
	Support project management and stakeholder coordination	Identify a dedicated point person and champion for the project with the range of skills to manage technical staff, agency and partner needs, and vendor relationships.
	Address interstate data sharing separately from integration	Because state and interstate political and legal contexts differ for interstate data sharing versus PDMP integration into HIT, expect to address these contexts separately.

Program Design—Lessons Learned

Each of the key lessons for program design and implementation is further described below, with examples from project states.

1. **Learn from the field.** Working with multi-state vendors enhanced progress; efficiencies in multi-state initiatives such as integration are realized when multiple states work with the same technical partners, including PDMP vendors, EHR vendors, and pharmacies. For example, a rapidly increasing knowledge base in interstate data sharing was being built by users of the PMPi hub as use of that hub increased from its start in 2011. That knowledge base enabled five of the six PEHRIIE cohort one states engaging in two-way interstate data sharing to greatly expand interstate sharing during the project, whether they had already initiated interstate sharing prior to the project (Indiana and Ohio) or initiated interstate sharing as part of the project (Illinois, Kansas, and West Virginia). In particular, use of the PMPi hub facilitated interstate sharing for these states with most of their bordering states—an important data source for providers seeking a comprehensive prescription history for their patients.

   In addition, Kansas, Ohio, and West Virginia achieved integration with the Kroger pharmacy chain (though Kroger's work in Kansas was not a part of the PEHRIIE project). In operating in multiple states, Kroger strongly favored an integration solution that could apply to multiple states, rather than working out separate solutions with individual states.

2. **Start small, then expand.** Building upon early foundation pilots and leveraging existing HITs is important. Five states (Illinois, Indiana, Kansas, Ohio, and Washington) built on work from an earlier pilot funded by ONC and SAMHSA, Enhancing Access to PDMPs using Health Information Technology, which provided a substantial foundation for the PEHRIIE activities. The ONC-SAMHSA pilot project was designed to improve prescriber access to PDMP data through secure report messaging, enhancing EHR systems, and exploring opportunities to leverage hubs for transferring PDMP data. Experience with the earlier pilot substantially enhanced each of these states' ability to carry out a more fully-developed or expanded interoperability project as part of PEHRIIE.



The ONC-SAMHSA pilot in Illinois focused on integrating PDMP data with Anderson Hospital's EHR system; the vendor building the connection was LogiCoy. As reported by multiple stakeholders, the relationships among these three entities developed during the pilot greatly facilitated expansion of integration at Anderson Hospital. Success at Anderson, in turn, has led to integration efforts currently in process at other clinics, hospitals, and health systems.

3. **Consider state context.** A wide range of state features and ongoing activities affected the progress of the work. States chose approaches largely due to contextual factors such as existing state infrastructure and regulatory mandates. Figure 5 lists some factors that should be considered as the program is designed and implemented.

FIGURE 5: STATE CONTEXT AND EXAMPLES

Contextual Category	Key Lesson for Success
Legal	• Legislative mandate to operationalize integration and interoperability, improving likelihood of success • Legislative mandate to register with and use PDMP • Regulations regarding data sharing (e.g., only in-state providers can access state PDMP data)
Health information infrastructure/ technical context	• Status of state HIT established infrastructure, if any • Experience of IT vendors in other integration and interoperability efforts • Public and private partnerships
Culture and history of opioid abuse activities in the state	• Established PDMP scope and activities • Consumer groups • State initiatives in place for PDMP data use, treatment, and prevention • Visibility among providers of efforts to address opioid abuse, including PDMP use
Market context	• Vendor interest and priorities • Costs of integration and interoperability to end users once project funding has ended

Mandated use laws—ranging from Maine's mandate for automatic registration with the PDMP, to Ohio's and West Virginia's mandatory use—likely enhanced use of the PDMP data. In Florida, the Attorney General and corresponding legal opinion regarding data confidentiality changed after the PEHRIIE proposal was submitted, prohibiting out-of-state provider access to Florida PDMP data, which resulted in delays to PDMP-EHR integration. In Washington, a key technical challenge involved barriers to adopting the version of technical programming standards required to transmit PDMP data.

Other technical challenges were linked to the level and nature of security encryption needed and the legal responsibility required for sensitive data transmission. For example, Illinois experienced legal challenges that centered on hospitals being unable to determine which staff members were logging in to the PDMP. The experience of these and other states underline the need to gather substantial information on potential legal and policy issues at the outset to promote successful project implementation.



4. **Engage stakeholders early and often.** The Illinois PDMP was able to engage physicians at Anderson Hospital in recognizing the importance of streamlined access to PDMP reports through integration with Anderson's EHR system. These physicians were critical in persuading the hospital administration to continue the project from its initial pilot integration with the ONC-SAMHSA pilot program. In Texas, the state brought stakeholders together to form the Technical Work Group, a collaborative work group that has pulled relevant parties together and provided the financial stability needed to drive project implementation.

   Similar to Texas, prior to the launch of the PDMP program Washington initiated relationship building, which has been credited as a key to the success of the state's PEHRIIE work. Staff of Washington's PDMP, Prescription Review, were able to engage numerous stakeholders, including the Washington chapter of the American College of Emergency Physicians (ACEP), the Washington State Hospital and Medical Associations, the Washington Unintentional Poisoning Workgroup, and the Washington "ER is for Emergencies" Work Group. Prescription Review staff also worked closely with their PDMP vendor, HID, and the vendors for the OHP HIE and EDIE hub, laying the foundation for PDMP-EHR integration in the state. Engaging key stakeholders in this way has yielded strong, sustainable results in both states, and stakeholders have continued to actively work together to integrate the states' PDMP into EHRs.



One effective approach to increasing coordination across stakeholders is to employ or designate a project point person or champion. The Maine PDMP, for example, used PEHRIIE funds to hire a full-time project coordinator to organize and foster communications with project stakeholders and to be a central repository for stakeholder concerns, issues, or new developments, which could then be addressed in a coordinated way.

5. **Design a mechanism for monitoring progress.** For each of the nine states, the PEHRIIE project was part of a larger vision and set of objectives the state intended to accomplish. To monitor the progress of each objective, including those associated with PEHRIIE, it is important to have a plan for measuring progress that helps ensure the agency level buy-in needed to sustain the project and that provides the basis for future cross-agency efforts. While state stakeholders were clearly familiar with standard PDMP metrics, having a plan up front with benchmarks to monitor use of PDMP data once integration and interoperability is established and adopted is crucial. PDMPs varied in their ability to determine providers associated with specific integration and interoperability sites, such as an EHR system or an HIE.

   A second reason to establish a mechanism for documenting and monitoring progress is to support project continuity in the event of changes in key personnel. In several states, due to turnover and changing priorities of stakeholders and state agency personnel, the program was stalled for periods of time. Having a documented plan and proposed timeline endorsed by all parties will promote seamless transitions as individuals leave and vendors or priorities change.

Program Implementation—Lessons Learned

1. **Ensure effective leadership and partner buy-in.** To be successful, a large program such as this, with many cross agency and public/private collaborations, must demonstrate leadership from critical stakeholders and hold a top priority at high levels in the state. Statewide HIEs in Indiana credited strong leadership from PDMP administrators with putting them at the table with health policy decision makers, leading to project successes. Likewise, the environment across the state of Maine was described as strongly supportive of work to improve the PDMP; this critical support extended across government agencies and stakeholder groups, including the PDMP Advisory Committee, the director of the Substance Abuse and Mental Health Services, and the Commissioner of Department of Health and Human Services (DHHS) in Maine. At the same time, hospitals across Maine were interested in the development of an integrated connection to the PDMP with the state HIE, HealthInfoNet (HIN), in order to promote medical data sharing.
2. **Support project management and stakeholder coordination.** Innovative skills may be needed to overcome barriers for successful project development and implementation; PDMP and state agency leadership must learn the details of the regulatory limitations and technical changes needed to enable integration and interoperability. Typically, stakeholder interactions with a PDMP are governed by state law or regulations. For example, the conditions under which providers are required to check the PDMP are part of state law or policy. However, stakeholders in integration and interoperability efforts are not required to participate. Stakeholders of the HIT systems with which PDMP reports are to be integrated may need convincing that integration with the PDMP serves their interests. PDMP administrators may consequently apply negotiation skills as well as the ability to effectively communicate highly technical concepts in a simple and easy manner to non IT stakeholders. When PDMP administrators lead integration and interoperability efforts, it is important that these leaders recognize the need for such skills and find ways to ensure they can be brought to bear.
3. **Address interstate data sharing separately from integration.** Specific to the PDMP context, it may be important to keep interstate data sharing and EHR integration distinct. This work progressed separately in most states, and it may be that two different technical approaches are needed. Stakeholders for interstate data sharing include all prescribers and dispensers, especially those registered with the PDMP, and particularly those whose patients live near the state border. Stakeholders for PDMP-EHR and PDS integration also include prescribers and dispensers, but in particular those associated with hospitals or other institutions participating in an EHR system or HIE. For the latter, the institutions involved and their accompanying legal and technical systems are at least as important as the providers themselves. The somewhat different stakeholder groups in the two cases, as well as their differing concerns and interests, suggest the utility of addressing PDMP-EHR and PDS integration separately from interstate data sharing.

Technical solutions implemented for interstate data sharing differ from those employed for PDMP-EHR and PDS integration. Specifically, the differing data formats for PDMP data and other health data come into play with PDMP-EHR and PDS integration and do not come into play for interstate data sharing. Differences in stakeholders, technical approach, and legal issues between PDMP-EHR and PDS integration and interstate data sharing are sufficiently large that it is more effective to address the two situations separately.

- For interstate data exchange, the primary legal issue is to reconcile which end user groups are allowed to have access to PDMP data in different states when those states share data.
- For PDMP-EHR and PDS integration, legal issues vary somewhat across institutions, but often concern which individuals, in addition to a patient's provider, are allowed to view PDMP data.

Conclusion

Increasing the use of PDMPs to inform clinical decisions and support interventions with patients who may be abusing prescription opioid medications is a key strategy for addressing the growing prescription opioid overdose epidemic. Thus, PEHRIIE program activities implemented in nine states focused on strengthening utilization of PDMPs by facilitating prescriber and dispenser access to PDMP data and increasing interstate data sharing, especially among bordering states. The project resulted in increased PDMP usage and contributed to a growing body of knowledge of effective practices regarding the design and implementation of programs aimed at PDMP enhancement. Advancements made through project work are expected to bring about improvements in prescribing and dispensing practices, ultimately leading to decreases in prescription opioid abuse and improvements in health care.

HOW CAN I REGISTER AND USE THE PDMP IN MY STATE?

Processes for registering and using PDMPs vary from state to state.

For information on your state's requirements, check the National Alliance for Model State Drug Laws online: www.namsdl.org/prescription-monitoring-programs.cfm



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Centers for Disease Control and Prevention

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Disclaimer: The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the CDC, SAMHSA, or Brandeis University.



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