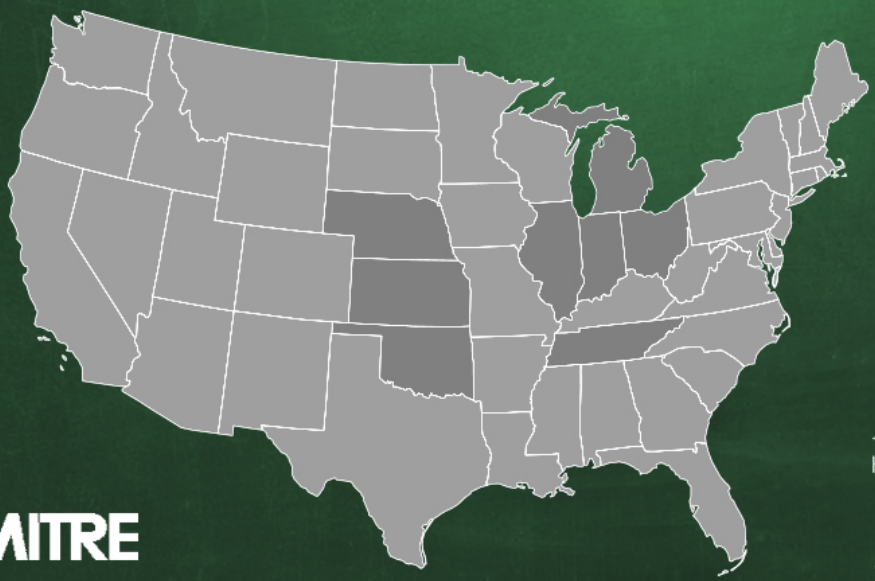
Enhancing Access to Prescription Drug Monitoring Programs Using Health Information Technology:

CONNECTING FOR IMPACT: Integrating Health IT and PDMPs to Improve Patient Care

2013



MITRE

The Office of the National Coordinator for Health Information Technology

Substance Abuse and Mental Health Services Administration SAMHSA

DEPARTMENT OF HEALTH & HUMAN SERVICES • USA

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INTRODUCTION

The Centers for Disease Control and Prevention (CDC) estimates that over 16,500 people die each year from overdoses involving prescription painkillers[1]. To address this problem, many states established Prescription Drug Monitoring Programs (PDMPs), which record data on the dispensed controlled substances within their state. The PDMPs contain valuable information for healthcare providers to enable early identification of individuals who may have a substance abuse problem. This information will help prevent the over prescribing and dispensing of controlled substances to these individuals and ensure adequate treatment is being provided to those individuals with legitimate medical needs.

Without PDMPs, it is almost impossible to evaluate requests for narcotic pain relievers on anything other than the information in patient records and what is provided by the patient. With the PDMP data, prescribers and dispensers now have the potential to see an accurate, state-wide history for every patient they are considering treating with narcotic medications.[2]

In 1939, California was the first state to establish a PDMP. This inaugural PDMP was a paper record system of narcotics prescribed within the state which eventually went online in 1998. Today, almost every state with an active PDMP stores its data in an online database made available to authorized users through a web portal. Many prescribers and dispensers place a high value on the information available to them from the PDMPs, yet they are frequently challenged to access this information given their busy schedules and constrained timeframes during patient encounters.

To help identify mechanisms for improving timely access to, and use of, PDMP information through health information technology (IT), the Office of the National Coordinator for Health IT (ONC) and the Substance Abuse and Mental Health Services Administration (SAMHSA) sponsored a project with The MITRE Corporation. Table 1 outlines the goals and objectives of this project.

Table 1. Goals and Objectives

Goals	Objectives
Connect	• Automate access to PDMP data for prescribers and dispensers • Establish interstate sharing of data for prescribers and dispensers • Maximize PDMP access through the use of intermediaries
Enable	• Identify ways to insert PDMP data into prescriber and dispenser workflows • Provide tools to evaluate PDMP data in real-time and provide analytics
Improve	• Analyze tools available for methodical evaluation of PDMP data • Identify ways to improve the data stored in PDMPs

[1] C.M. Jones, "Pharmaceutical Overdose Deaths, United States, 2010, " *JAMA,* vol. 309, no. 7, pp. 657-659, Fe, 2013
[2] Schedule II-V of Section 1308.12 of the Code of Federal Regulations

PHASE 2 PROJECT OVERVIEW

In the second phase of this project, the Federal Government, state PDMPs, care delivery organizations, health IT businesses, and MITRE organized and configured seven implementations demonstrating interoperability between PDMPs and health care providers. These studies tested the ease and effectiveness of establishing new connections with PDMPs so that this information could be available to prescribers and dispensers at the point of care. This report is a companion piece to 2012 reports detailing the results of six pilot studies that took place in Phase 1 of this project, which spanned from March to September of 2012.

The seven new implementations focused on improving access to PDMP information for three primary stakeholders: ambulatory providers, emergency department physicians, and pharmacists. The implementations streamlined clinical workflows, automated tasks, and increased the timeliness of PDMP information.

BUILDING ON LESSONS LEARNED

The 2013 cohort of implementations built on the lessons and feedback garnered from the 2012 pilots. The findings carried forward for further investigation centered on the following impact areas:

- **Clinical Decision Making**: Presenting PDMP information within the context of the patient's full medical history (within an electronic health record (EHR) system) resulted in increased value and improved clinical decision-making for prescribers and dispensers over presentation of this same data in isolation.
- **Automation**: Using patient data to generate automatic PDMP queries increased the speed and efficiency of accessing controlled substance history data within an EHR, health information exchange (HIE), ePrescribing solution, etc.
- **Integration:** Integrating PDMP data as a resource of HIEs or pharmacy benefits management switches provided a mechanism for improving access to a more complete medical picture through a single resource.

Finally the design and interoperability problems presented by each of the seven implementations reflect the typical issues associated with integrating legacy solutions, such as standalone PDMPs, with new capabilities like EHRs.

OVERALL FINDINGS

Clinical Decision Making

The 2013 implementations successfully increased access to patient prescription drug history information in PDMPs, and providers and dispensers reported value in having this information available when caring for patients.

Prescribers and dispensers overwhelmingly reported increased satisfaction with their workflows when pre-queried PDMP data was automatically presented within the context of the patient's full medical

history in the EHR. Providing the PDMP data as a part of the patient's HIE-based community health record was considered especially beneficial as it enabled the review of PDMP data in the broadest patient context.

The Indiana implementation focused on including summary rather than raw PDMP information. This provided additional diagnostic power for clinical decision-making. For example, prescribers appreciated the use of risk assessment tools and alerts that allowed them to screen a patient's risk of abusing prescription drugs. These risk assessment tools not only included analytical evaluations of risk but also provided additional contextual information about the patient in the form of their full controlled substance prescription history. Indiana's Wishard Hospital incorporated these risk assessment tools into a clinical decision alert to guide prescribers during the prescribing process.

Key Insights

- Implementations showed enhanced access to PDMP data and value to providers
- PDMP information is most valuable when integrated within the patient's record
- Risk assessment tools and alerts have proven to be a valuable tool in clinical decision support

Prior to the implementations, a key barrier to the use of PDMP data was a lack of alignment between the clinical workflow and the process of accessing PDMP data. To address this, all of the implementations (except Tennessee) worked to align the access point for PDMP data with the existing workflow to minimize disruptions and streamline the time to access the data.

Furthermore, data should be presented in chronological order to support quick identification of trends in a patient's use of controlled substances. Physicians appreciated having data available for every patient rather than relying on their own instincts to identify when to check the PDMP.

Although outside this project's scope, a common observation was a need to address a patient's treatment plan when they are denied controlled substance prescriptions. Often times very little training is provided to medical professionals around how to refer a patient into substance abuse treatment. Therefore, providing educational programs to prescribers and dispensers about resources available for treatment was another opportunity identified by the implementation participants.

> *"Being able to easily click a button in the patient's record to see the prescription drug information without having to [login to a separate PDMP application] would be great. The number of clicks are important."*
>
> *Jill Reese, PA*

Automation

A key barrier to PDMP use is the lack of efficient mechanisms to retrieve data. There are two broad ways of receiving PDMP data: solicited and unsolicited.

Solicited data access or reporting is the model in which an authorized individual requests the controlled substance prescription history for a specific patient. Typically, this requires the requestor to enter a set of demographic information about a patient such as name, date of birth, and address.

Unsolicited data reporting is a process through which a PDMP generates reports as a result of a patient exceeding a predefined threshold in a given period of time. There are a variety of thresholds that often comprised of a ratio of prescribers and/or dispensers and prescriptions over a given time interval. The PDMP sends a report by fax, mail, or email to each individual who either prescribed or dispensed controlled substances to a patient exceeding the threshold.

Solicited Data

The implementations discussed in this report demonstrated that automating the PDMP data request process by pre-populating provider credentials and patient matching information from EHR and pharmacy systems directly to the PDMP is an effective way to ensure access to the information at the appropriate point of care. Specifically, several implementations demonstrated the value of single sign-on (SSO) capabilities to pass requestor credentials and patient demographic data directly to the PDMP. The use of SSO allowed for automated authentication and receipt of patient PDMP data and eliminated the need for duplicative data entry. Furthermore, the Illinois and Indiana implementations leveraged the admission, discharge, and transfer (HL7 ADT v2.x) message data from an emergency department (ED) to automatically trigger an exchange of PDMP information without the need for any specific action on the part of the physicians.

Key Insights

- Automated access promotes data availability
- Robust patient matching algorithms increase user confidence
- Unsolicited reports have the greatest value in care settings where there is an ongoing relationship with the patient
- Simple solutions, such as adding SSO to the PDMP, added value

"Going into [the Indiana PDMP] INSPECT before was a full thought process of – I need to go look for this information. We are in [our care management system] CareWeb almost all of the time looking up clinical history information and now INSPECT is there right in front of you – much more usable and available."
Jason Schaffer, MD Methodist Emergency Department

Unsolicited Data

Traditionally, unsolicited reporting has been a manual process used to alert prescribers and dispensers when a patient exceeds a set threshold for controlled substance prescriptions. Generation and delivery of these reports can be time-consuming, resulting in the information being received days, weeks, or even months after the patient encounter. For legislative and efficiency reasons, not all states are able to engage in this type of proactive notification.

The Kansas implementation directly addressed some of the efficiency issues through the use of health IT. This implementation involved the use of an open source intermediary that manipulated a large electronic document containing all of the alert letters generated for providers based on the thresholds set for that state. In Kansas the PDMP administrator historically printed and mailed the document in hard copy. Now, as a result of the implementation, technology converts the document into individual

electronic files with associated email addresses. Specifically, an intermediary used DIRECT[3] to securely send these files to their intended recipient directly in their EHR system, which subsequently placed the PDMP reports into the physicians' clinical workflow (see Kansas Implementation Summary below).

A primary focus of the implementations was the interoperability between the PDMP, prescribers, HIEs, and EHRs. Overall, the implementations demonstrated that different levels and types of automation can be used to facilitate and drive effective exchange of information between practitioners and PDMPs.

> *"For a program whose intent it is to provide information to providers in the quickest and most efficient manner as possible, automation of unsolicited reports saves our program time, money, helps us meet our goals, and just makes sense."* *Christina Morris, KS PDMP Administrator*

Integration

A lack of technical maturity and limited interoperability adversely affects access to PDMP data. Conversely, better integration of data resources available to practitioners facilitates the accessibility of PDMP data.

The implementations demonstrated improved connections to PDMPs by healthcare systems through intermediaries such as HIEs. By leveraging the HIE infrastructures and relationships, some implementation participants integrated PDMP data directly into the patient context. The system automatically retrieved this information and presented it to the prescriber in the EHR.

Key Insights

- Leveraging HIE networks ensures maximum scalability and accessibility
- Readily available information in the EHR provides maximum value
- Reuse and open source approaches yield the most cost-effective results

Some states struggle to find a sustainable business model for their PDMPs. The results of the implementations suggest that states relying on external funding sources for their PDMP capabilities face the risk of lapses in funding and potential service interruptions as a result. One approach for states to leverage limited resources is the sharing and reuse of existing technologies across PDMPs (see Tennessee Implementation Summary below). By leveraging PDMP information exchange specifications developed and implemented by other states or through federal government initiatives, a state can reduce its development costs.

> *"Now [we're] taking two resources and combining them into one location with the 'one click' to access CareWeb and the INSPECT data."* *Ryan Gethers, MD, IU West ED*

Data Integrity and Privacy

PDMPs contain sensitive protected health information (PHI) and, as such, they must follow privacy regulations. PHI requires data integrity and privacy measures to ensure the confidentiality, validity, and

[3] The Direct Project was created to specify a simple, secure, scalable, standards-based way for participants to send authenticated, encrypted health information directly to known, trusted recipients over the Internet. Source: http://www.healthit.gov/policy-researchers-implementers/direct-project

availability of all electronic health information. Additionally, it is vital that PHI is protected in transit between systems and when it legally persists outside of the PDMP. All parties involved in the data exchange and use (including patients) must have full confidence in the correctness, timeliness, and secure treatment of this private health data.

A significant complication noted is that PDMPs reside in different state entities (e.g., Departments of Health, Departments of Justice); yet, all PDMPs must adhere to similar federally mandated privacy requirements associated with PHI. Additionally, each state has stringent data access regulations to ensure patient privacy. These protections must be in the forefront of any integration, particularly as data access becomes more automated.

To help address a portion of these needed security safeguards, the implementations demonstrated the successful use of several methods for PDMP user authentication. In the most integrated, automated, and distributed model, the state PDMP was an open member of a state HIE allowing access to all HIE members without individual physician registration (see Indiana Implementation Summary). This level of integration required state senate approval and gave authentication authority to the HIE as a trusted partner. As a result, HIE member prescribers and dispensers were no longer required to have individual PDMP accounts and all data access occurred through the HIE. The PDMPs rely on logged HIE data to track who has accessed the data should the need arise.

Key Insights

- Real-time PDMP data reporting leads to greater confidence in the information
- PDMP data should not be displayed with other prescription drug information
- Role-based authentication should be used to access information as appropriate within state law
- Audit trails enable more seamless integrations.
- Effective identification of a person presenting in an ED is imperative to ensuring data accuracy

Conversely, in another implementation, providers accessed PDMP data through a HIE and state laws required that the PDMP retain authentication authority. To support this requirement, the PDMP request included the appropriate credentials of the requestor. In both of these models, access is streamlined as the user is only required to maintain one username and password, and all data is accessed from a single source, the HIE. Each state addressed the patient's privacy and data security with varying degrees of control.

As the health community leverages more automated methods for accessing data, it is imperative to address common concerns around data integrity and security.

> *"Indiana's PDMP relies on the authentication and audit trails of the HIPAA-compliant health information exchange for the secure delivery of PDMP data to practitioners."*
>
> *Marty Allain, Indiana PDMP Administrator*

LEARNING AND BUILDING – DESIGN CONSIDERATIONS

The implementations used a variety of custom and standards-based solutions. The designs were meant to achieve interoperability between EHRs, HIEs, PDMPs, and pharmacy systems. Local circumstances and short-term results drove the technologies used in each implementation.

Data Storage

Typically, PDMP data is available for viewing but not integrated with EHR data. State statutes and policy can prohibit storing PDMP data directly in another system such as a provider's EHR system. The format of the PDMP data presented varies from Portable Document Format (PDF) files to Extensible Markup Language (XML) data that can be further analyzed, processed, and rendered for review.

Decision Support/Data Analysis

Each organization involved with the implementations had ideas for moving forward with additional uses of PDMP data for clinical decision making. Two of the implementations, Indiana and Michigan, included a patient risk score that was well received. The flag or alert indicated prescription use outside of normal behavior. This enabled the prescriber to decide when it was necessary to review the details of the full PDMP report but was not intended to replace clinical decision making.

The Role of HIE and Other Intermediaries

There were many examples where intermediaries were efficient and effective for enhancing access to PDMP information. HIEs were a hub for health information and, in effect, provided an established platform for the distribution of PDMP data. Three implementations leveraged HIEs (Nebraska, Indiana, and Oklahoma).

An Indianapolis-based HIE delivered PDMP data into the EHR for local hospitals. The Indiana PDMP went so far as to ask the State Legislature for approval to make the PDMP permanently available as a resource on the HIE. To support this, the Indiana PDMP trusted the authentication and privacy rules of the HIE completely.

An Oklahoma City-based implementation also used a HIE for data transfer. However, the PDMP authentication and security remained within the Bureau of Narcotics and a SSO was managed as part of the automated data request. That being said, as a result of this implementation, Oklahoma is working with its state legislature to approve broader and less restrictive access to the PDMP and production availability of this implementation is dependent on modifications to state law.

Finally, in Nebraska, providers also accessed PDMP data through a HIE. In this case, the PDMP data was not stored in a state-based database but provided as a service to the HIE by a pharmacy health information network.

OTHER FEDERAL EFFORTS

On October 14, 2012, SAMHSA awarded nine grants to states to support further PDMP to EHR integration and also enhance interoperability of data exchange between PDMPs. Four of the nine

grantees were implementation partners. With the additional funding from the federal government, those states plan to build on the success of the current work and identify new and innovative ways to establish additional integrations in different work settings. For example:

- **Kansas** plans to evolve from unsolicited to solicited reporting using DIRECT.
- **Indiana** plans to extend to five other HIEs in the state and integrate with third-party data sources such as ePrescribing and pharmacy information networks.
- **Illinois** plans to provide automated and integrated PDMP access to a majority of the community and local hospitals using the same open source integration model.

> *"… the [PDMP] data, which is the prescription monitoring program, has been really instrumental in helping providers understand the lack of fidelity with some of their patients. The stories [patients] give are incomplete. And that the information can really inform the decisions both in terms of establishing trust or a lack of it. And so the easier that data is to obtain, the more often that data will be used. The more often it is used, the safer the practice can be."*
>
> **Palmer MacKie, MD**

CONCLUSIONS

The implementations demonstrated that providing enhanced access to PDMP data can greatly help address the growing prescription drug abuse problem in the United States. Prescribers and dispensers repeatedly expressed the value they saw in the information provided by the PDMPs and indicated that, when possible, they made every effort to access that information before prescribing controlled substances. Providers overwhelmingly indicated that the PDMP data gave them the confidence needed to prescribe pain medication for their patients when appropriate and identify those that may be at risk. These implementations increased the overall number of PDMP patient reports available to prescribers, generated easy to use reports which helped prescribers quickly identify when further investigation was needed, and decreased the time necessary to notify prescribers when a patient they have been seeing may be at risk for prescription drug abuse.

Although there are many ways to enhance access to PDMPs, as demonstrated by the varying implementation models, the guiding principles in Figure 1 emerged from this effort:

Figure 1: Guiding Principles for Making PDMP Connections

Time	It is important to find ways to save providers time when accessing PDMP data. ***Consider the following:*** ✓ Automate the PDMP query process using triggers when possible (for example, patient check-in, e-prescribing) ✓ Provide seamless access to PDMPs (the ability to access PDMP data without requiring separate login information)
Clinical Decision Making	Providers are more likely to use PDMP data when it is easy to access and understand. ***Consider the following:*** ✓ Easy-to-use PDMP reports support providers in caring for their patients ✓ Risk assessment tools and alerts are helpful to more quickly identify patients at potential risk for prescription drug abuse
Workflow and Effort	Placing PDMP data directly into a provider's current workflow increases the likelihood of use. ***Consider the following:*** ✓ Provide patient reports to providers prior to their patient encounter ✓ Provide PDMP reports directly in existing EHR systems where allowed

Technology	The implementations identified several key technologies as a result of working with different vendors and solutions. ***Consider the following:*** ✓ Health Information Exchanges can play a key role in accomplishing PDMP-to-provider connections ✓ DIRECT can be used securely with both unsolicited and solicited request ✓ The privacy and security models of hospital or provider-based EHR systems are often robust enough to satisfy PDMP access requirements

Partners

In this project, some of the best public and private entities came together to address prescription drug abuse. All of the participating organizations rallied behind this common cause because of the expectation that health IT is one way to increase PDMP usage during the clinical decision-making process. Figure 2 represents the 35+ organizations that committed to the project's outcomes.

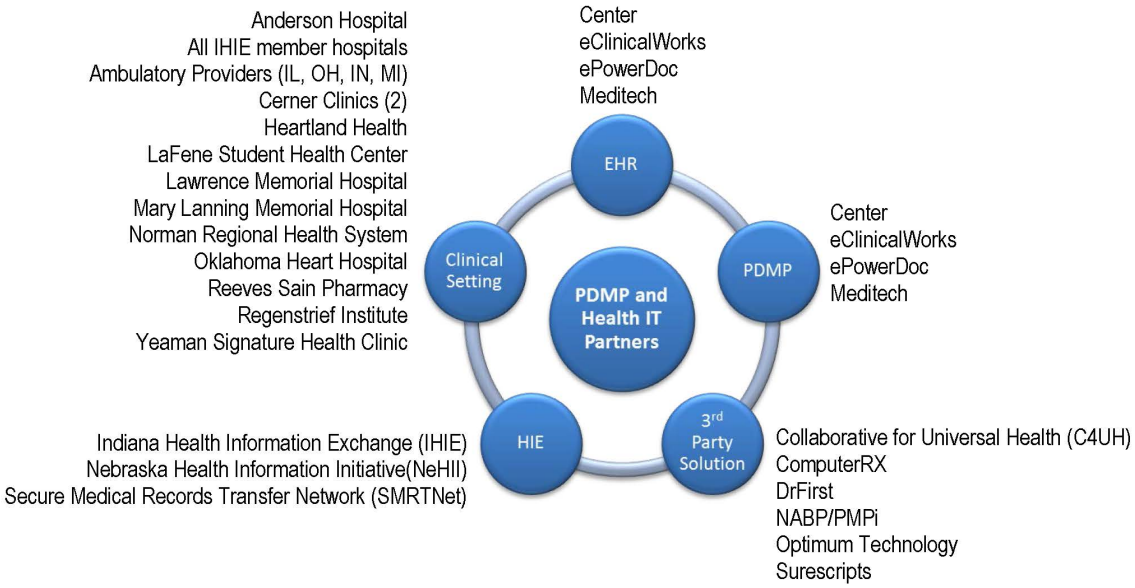


Figure 2: Implementation Participants

IMPLEMENTATIONS AT A GLANCE

The individual implementation overviews provide more detailed information about each effort. These sections include information about the implementation goals, design, participants, technologies, and legal considerations. In addition, these summaries provide the metrics used to measure the success of each implementation and a description of next steps at the conclusion of the measurement period.

Implementation Name	End User	State PDMP(s)	Implementation Summary	Benefit
Illinois	Emergency Department Prescribers	Illinois PDMP	Report triggered by admission feed automatically sent to a provider's EHR system; response delivered via DIRECT messaging as PDF report on that patient	Provides easier access to PDMP data
Indiana	Emergency Department Prescribers	Indiana (INSPECT), Ohio (OARSS), & Michigan (MAPS)	Separate provider groups access the PDMP via the IHIE and see the results displayed in their care management system	Uses HIE and analytics to improve access and use of PDMP data
Kansas	Hospital and Ambulatory Prescribers	Kansas PDMP (K-TRACS)	Distribution of unsolicited alert messages via DIRECT messaging	Capitalizes on DIRECT to automate and streamline a paper process
Michigan/ Indiana/ Ohio	Ambulatory Prescribers	Indiana (INSPECT), Ohio (OARSS), & Michigan (MAPS)	Automatic query of multiple state PDMPs from the user's ePrescribing workflow	Integration of multi-state PDMP information in the prescribing workflow
Nebraska	Emergency Department Prescribers	Nebraska PDMP (NeHII)	Automatically connecting an ED EHR with the PDMP housed within the state HIE through use of SSO capability	Uses HIE to access PDMP data
Oklahoma	Emergency Department & Ambulatory Prescribers	Oklahoma PDMP	Integrating a PDMP with an HIE to enable access to PDMP data through an EHR	EHR integrated access to PDMP data will promote more informed dispensing and prescribing
Tennessee	Dispensers	Tennessee PDMP	Real-time reporting of dispensed controlled substance data to the PDMP using an existing network	Real-time dispensing data will promote more informed dispensing and prescribing

Overview

Anderson Hospital is a small, 100 bed community hospital located in western Illinois, about 35 miles outside of St. Louis, Missouri. Anderson relies heavily on contract providers for their emergency department (ED) staffing. While Anderson feels strongly about the importance of using the Illinois state prescription drug monitoring program (PDMP), their actual usage has historically been very low. The current workflow to access the PDMP data requires logging in to the PDMP portal outside of the providers' EHR and often times the contract providers do not have the necessary authorized accounts. The goal of this implementation was to provide emergency room physicians at Anderson Hospital with enhanced access to PDMP data, through streamlined and automated workflows, without significant investments or modifications to their electronic health record (EHR) system.

The Illinois PDMP integration implementation explored the use of DIRECT[4] messaging to deliver PDMP data to ED physicians. A request for a report was sent to the PDMP upon patient check-in to the ED using an automated query. If a report was available, it was immediately returned to the hospital in a Portable Document Format (PDF), which could be viewed by the ED physician directly in the EHR.

As a result of this implementation, the total number of queries to the PDMP made by Anderson Hospital jumped 95% indicating a substantial increase in access to patients' controlled substance information. In addition, manual queries to the PDMP through the web portal were down 47%. Automated access to data is more convenient and saves time for the providers. Mid-level providers and physicians expressed a great deal of excitement around the ease of the new process and many were relieved that they would now have the ability to better understand a patient's controlled substance prescription history prior to prescribing. An important lesson learned through this process was the value of having the PDF available directly in the patient care workflow, rather than in a stand-alone DIRECT inbox.

For more information on the specific design please see the section below.

Implementation Design

This implementation demonstrated the use of an automated query triggered by a patient presenting at the ED at Anderson Hospital (Figure 3). Specific components of the design included:

- Developing the capability to generate an automatic PDMP query based on the hospital's standard HL7 v2 Admission, Discharge, and Transfer (ADT) feed
- Implementing the DIRECT message capability to deliver a PDMP report to the clinician in their EHR system

[4] The Direct Project was created to specify a simple, secure, scalable, standards-based way for participants to send authenticated, encrypted health information directly to known, trusted recipients over the Internet. Source: http://www.healthit.gov/policy-researchers-implementers/direct-project

Two intermediaries were leveraged with this implementation. Prescription Monitoring Program Interconnect (PMPi), an existing PDMP interstate data sharing hub, served as the interface to the PDMP allowing data sharing to occur from an otherwise closed system. The Collaborative for Universal Health (C4UH) created open source software that transformed the ADT feed into a PDMP query, converted structured data into PDFs, manipulated the PDF report returned from the PDMP and endorsed the use of DIRECT. Together they served as critical components to enable the PDMP to EHR transaction.

Figure 3: Illinois Workflow

1) A patient presents at the ED. The hospitals standard ADT feed triggers a message to the C4UH ToolKit,[5] which serves as a data processing mechanism
2) The C4UH ToolKit transforms the message into an Illinois PDMP query and transmits it to the PMPi hub
3) PMPi has an existing interface to the Illinois PDMP and routes the request
4) The Illinois PDMP generates an Extensible Markup Language (XML) report response back to PMPi
5) PMPi routes the XML results back to C4UH. C4UH transforms the response into to a PDF document
6) C4UH delivers the PDF document via DIRECT where it is accessible from within the EHR

Implementation Participants

Name	Description
Anderson Hospital[6]	ED and 4 associated Urgent Care Centers
Collaborative for Universal Health (C4UH)	Third-party intermediary performing adapter and routing services (C4UH Toolkit)
NABP/PMPi	Facilitates the transfer of PDMP data across state lines to authorized users
Illinois PDMP	PDMP recently connected to PMPi

[5] C4UH ToolKit is an Open Source tool that works to convert structured data into PDFs as well as the inverse.
[6] This is the entity that authenticated an individual to access PDMP information.

Technical Integrations Required

Integration	MOU	Data Exchange
Anderson ↔ C4UH ToolKit	Yes	ADT feed to C4UH PDF to Anderson
C4UH Toolkit ↔ PMPi	Yes	PMPi query to IL PDMP
PMPi ↔ PDMP (IL)	Yes	Existing connection IL PDMP XML report response to C4UH

Standard Characteristics

Name	Response
Single Sign-On *User identification information is passed to other systems without re-entry of the data*	Yes
Using Patient Context *Patient demographics are passed to other systems without re-entry of the data*	Yes
Involves DIRECT Messaging *DIRECT messaging is part of the implementation*	Yes
SAMHSA Grantee *Does the PDMP have a SAMHSA grant*	Yes
Query Trigger (ADT, Button Click, etc.) *Action that triggers the PDMP query for patient controlled substance prescription history information*	ADT
Query Interface (PMPi, Open Interface, etc.) *Technology used to query the PDMP*	PMPi
Implementation User Base *Role of the implementation participants*	ED physicians, nurses, and physician assistants
Phase 1 Pilot Participant	No

Legal Considerations

Name	Response
Can PDMP data persist in another system (EHR)?	Yes
Can a doctor legally delegate PDMP access?	Yes

Outcomes

Automating the query from within the EHR was easier and faster, resulting in increased usage by providers. The one to two-click access combined with the information being available during the patient encounter increased satisfaction. Additionally, using open source tools such as the C4UH Toolkit and DIRECT helped lower costs and provided reusable solutions that were scalable to other providers.

Area of Interest	Outcomes	Results
Ease of Use	Easier for prescribers to view patient data within their current system Easier querying based on an automated ADT trigger	Automatic query upon registration lessens burden on providers to look up the data manually The automation allowed for a reduction in the number of manual queries made to the PDMP By automating the query to the PDMP, requests increased from Anderson Hospital
Fit with Workflow	Allows prescribers to see the PDMP information as part of their normal activities Reduces, not adds to, clinical overhead for accessing PDMP data	Providers have access to a patient's controlled substance history before the encounter and can choose to use it at the point of care they find most effective Providers now have "one-click" access to the data from the current EHR system
Technical Impact	No changes to PDMP software required Use of DIRECT ensures security and affordability for smaller prescribers	Anderson was able to connect to the PDMP using a standard interface, PMPi
Clinical Impact	Results in appropriate intervention of a patient as necessary	43% of patients queried had a PDMP report available that may never have been viewed in the past model
Driver of Adoption	No barriers to entry for those prescribers who currently have access to a DIRECT inbox	Through the use of open source tools, Anderson was able to implement with very little cost or disruption

Metrics

Post-implementation data represents the period between February 18, 2013 to February 26, 2013. Because this is new functionality there were no pre-implementation data.

Metric	Source/Calculation	Pre-Impl.[7] Count	Post-Impl. Count
Number of ADT queries to the PDMP	IL PDMP	N/A	385
Number of ADT queries returning a report	IL PDMP	N/A	166

An Eye to the Future

The implementation will remain in use after the end of the evaluation period. The following are plans for expansion:

- Enhanced monitoring of the ADT feed to avoid an automatic query from being lost
- Further integrate the PDMP data into workflow by migrating the report from the DIRECT inbox into the EHR document store
- Expand to other small-to-mid-sized hospitals in Illinois using open source integration engine software and the PDF/PDMP conversion tool
- Make the C4UH ToolKit and PDMP conversion capability available as an open source solution

[7] Impl. = Implementation

Illinois Implementation

Dr. Tom Lang

Anderson Hospital
SERVING SOUTHWESTERN ILLINOIS

In their own words . . .

"I access the PDMP for all of my patients with pain complaints by logging in directly at the web portal. I print out the report and take it in to the room with me. Being able to easily click a button in the patient's record to see the prescription drug information without having to do that would be great. The number of clicks are important."

- Jill Reese, P.A.

Other P.A.'s are saying...

"This is very helpful; now I don't have to go to the trouble of looking the patient up myself."

".. this is great; it will be very helpful to give the nurses access to this information; some of the doctors don't look at this, but many of the nurses will be relentless about pointing this information out to them"

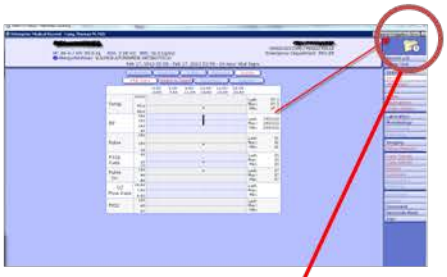
"this will be very helpful, why don't we have this type of access in ALL healthcare settings?"

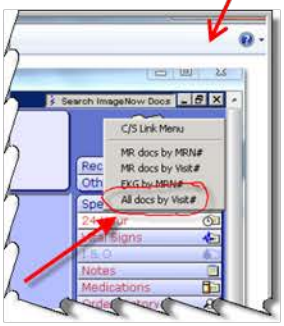
"this is awesome, nurses will now be able to assist the docs in reviewing this very helpful information at the time they are making care decisions"

Anderson Hospital Emergency Department (Maryville, Illinois)

Optimization

PDMP Data within the Patient Context





A PDF was delivered using DIRECT and required only ***two clicks*** to access the PDMP data within the EHR

Overview

Wishard Hospital, one of America's five largest safety net hospitals based in Indianapolis, participated as a pilot site in Phase 1. It explored opportunities to make prescription drug monitoring program (PDMP) data readily available to emergency department (ED) physicians during patient encounters. Specifically, the Phase 1 pilot showed the value of providing PDMP data through an ED management system. A PDMP query was triggered upon patient check-in, and the resulting data was received, stored, and processed for use during the patient encounter. This pilot was a resounding success and word quickly spread to other Indianapolis based hospitals, who sought the more streamlined and time saving access to PDMPs. Meanwhile, as Wishard continued to use the pilot functionality, the providers identified opportunities for even greater improvement.

Three goals emerged for the Phase 2 implementation. The first goal was to meet the demand to scale the new integrated PDMP functionality in other hospitals while minimizing cost and impact. As a result, the existing Wishard functionality was expanded to other Indianapolis based hospitals through the use of the Indiana Health Information Exchange (IHIE). The second goal was to explore the use of industry standard analytics to produce a patient at-risk score to identify patients at higher risk for prescription drug abuse and further reduce the time necessary for Wishard physicians to effectively use the PDMP data. In this implementation, the results of the PDMP query were run through an analytics process and the results returned in a modified format that included all of the patient's controlled substance prescription history augmented with a composite risk score. A proprietary scoring algorithm called NarxCheck was used for this purpose. The final goal of the 2013 implementation was to explore the impact of expanding the integrated functionality to query PDMPs in surrounding states. This expansion intended to address both the scalability of the system and the integration of multi-state data. The original 2012 pilot used an interstate PDMP data sharing hub, Prescription Monitoring Program InterConnect (PMPi), as an intermediary for access to the Indiana PDMP. The new implementation expanded the existing connection to include the additional states of Ohio and Michigan.

These goals resulted in two separate but connected implementations in Indiana in 2013. Both of the implementation designs leveraged existing ED processes, a health information exchange (HIE), and the use of an intermediary to send automated requests to the PDMP.

As a result of these implementations, the number of prescribers accessing the state PDMP (INSPECT) through the HIE increased by 80%. In addition, total queries to the PDMP were up 63% statewide. Finally, in a one month period between January 23, 2013 and February 22, 2013, 72 reports notified providers that their patient was at risk for abuse and prompted them to further explore their patients' prescripton drug history. Another interesting outcome of these efforts was the pioneering role that INSPECT took in promoting PDMP data as health IT. INSPECT is already working with other HIEs in the state to provide similar automated access.

Implementation Design

This implementation expands on the Phase 1 Regenstrief/Wishard pilot that connected a single hospital to INSPECT. Key components of the design included (Figure 4):

- Leveraging the state HIE to scale to a wider group of providers across the state. IHIE provided capability to expand access to the PDMP to a larger, heterogeneous group of prescribers
- Streamlined access to the state PDMP by using single sign-on funtionality by leveraging the provider's authorization with the HIE to be granted access to PDMP data
- The implementation also used an interstate PDMP sharing hub, Prescription Monitoring Program InterConnect (PMPi), as an intermediary for access to the PDMP data for three PDMPs (Indiana, Ohio and Michigan)
- The design used NarxCheck, an algorithm that analyzes a PDMP record and presents a graphical summary and at-risk score

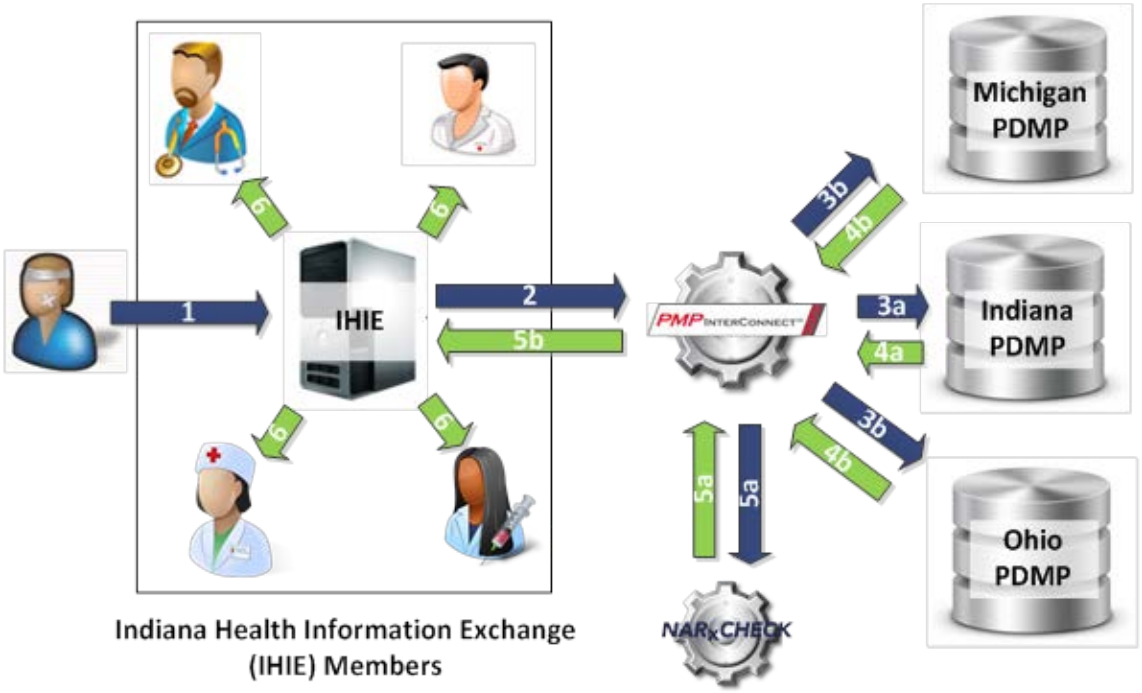


Figure 4: Indiana HIE Workflow

Design A: Exploring Data Analytics

1) Patient presents at the Wishard ED. HL7 v2 Admission, Discharge, and Transfer (ADT) feed triggers request to IHIE for patient's controlled substance history information
2) IHIE automatically generates a query for INSPECT's data and routes it through PMPi
3) PMPi has an existing interface to INSPECT and routes the query to INSPECT (Step 3a)
4) INSPECT returns an Extensible Markup Language (XML) report response back to PMPi (Step 4a)
5) NarxCheck is running on the interstate hub (Step 5a). NarxCheck analyzes and summarizes the patient data and returns a formatted report to IHIE (Step 5b)

6) The provider accesses the NarxCheck score and full PDMP report via CareWeb, a web portal interface to IHIE

Design B: Multi-state Querying

1) Patient presents at the ED. ADT feed triggers request to IHIE
2) IHIE automatically generates a query for PDMP data from Ohio, Indiana, and Michigan and routes it through PMPi
3) PMPi automatically queries INSPECT, the Ohio PDMP (OARRS), and the Michigan PDMPs (MAPS) for the patient's controlled substance history information (Steps 3a and 3b)
4) The PDMPs return available patient data to PMPi (Steps 4a and 4b)
5) PMPi returns the multi-state PDMP results to IHIE (Step 5b)
6) The physician accesses the PDMP report via CareWeb, a web portal interface to IHIE

Implementation Participants

Name	Description
Indiana Health Information Exchange (IHIE)[8]	Indianapolis-centric health information exchange
Regenstrief Institute	Research hospital integral in the enhancement and support of IHIE and CareWeb
All IHIE member hospitals	All IHIE member hospitals, including Indiana University (IU) Health (Methodist) (802 beds), Community North (389 beds), St. Francis (400 beds), and Wishard Hospital (316 beds)
Indiana PDMP (INSPECT)	Indiana's Prescription Drug Monitoring Program
Ohio PDMP (OARRS)	Ohio Prescription Drug Monitoring Program
Michigan PDMP (MAPS)	Michigan Prescription Drug Monitoring Program
NABP[9]/PMPi	Facilitates the transfer of PDMP data across state lines to authorized users
NABP/NarxCheck	Third party PDMP data analysis solution

Technical Integrations Required

Integration	MOU	Data Exchange
Wishard EHR ↔ IHIE (native)	No	Electronic health record (EHR) view into patient record located on the HIE

[8] This is the entity that authenticated an individual to access PDMP information.
[9] National Association of Boards of Pharmacy

Integration	MOU	Data Exchange
Cerner ↔ IHIE (CareWeb)	No	Single sign-on (SSO) to HIE
Epic ↔ IHIE (CareWeb)	No	Web link to HIE
IHIE ↔ PMPi	Yes	XML PDMP data to IHIE
PMPi ↔ PDMPs (IN, MI, OH)	Yes	Existing Connection

Standard Characteristics

Name	Response
Single Sign-On *User identification information is passed to other systems without re-entry of the data*	Only for hospitals using G3[10] or Cerner
Using Patient Context *Patient demographics are passed to other systems without re-entry of the data*	Only for hospitals using G3 or Cerner
Involves DIRECT Messaging *DIRECT messaging is part of the implementation.*	No
SAMHSA Grantee *Does the PDMP have a SAMHSA grant*	Yes
Query Trigger (ADT, Button Click, etc.) *Action that triggers the PDMP query for patient prescription history information*	ADT
Query Interface (PMPi, Open Interface, etc.) *Technology used to query the PDMP*	PMPi
Implementation User Base *Role of the implementation participants*	All IHIE member hospitals
Phase 1 Pilot Participant	Yes

Legal Considerations

Name	Response
Can PDMP data persist in another system (EHR)?	Yes
Can a doctor legally delegate PDMP access?	Yes

Analytics

To understand these outcomes and metrics, it is important to understand what the NarxCheck scoring algorithm is and its recommended use. A NARx Score is the total number of controlled substances

[10] Regenstrief's enhanced care management system

prescribed and filled combined with relevant behavioral measurements. The following guidelines are provided for the use of the NARx Score[11]:

< 200	**Be Confident**	The patient's record is unlikely to reveal a concerning pattern or level of use
200–500	**Be Curious**	The patient's record may reveal a concerning pattern or level of use
> 500	**Be Cautious**	The patient's record is likely to reveal a concerning pattern or level of use

Outcomes

All of the implementation goals met or exceeded participant expectations. The SSO capability saved time and eliminated extra steps by removing the need to access the PDMP from a separate, standalone computer. The providers favored the NarxCheck scoring system as a diagnostic tool translating the PDMP data. Finally, providers reported that the PDMP data helped round out the complete picture of a patient's medical history and having it all in one place was very beneficial.

Area of Interest	Outcomes	Results
Ease of Use	Prescribers already using IHIE and/or CareWeb network have SSO access to the PDMP Prescribers who currently receive a summary sheet on ED admits from IHIE now receive PDMP data on that report	Nearly 50% of patients queried by the system had a PDMP report available that may never have been viewed in the past model
Fit with Workflow	Providers with EHRs have the opportunity to have the PDMP data directly integrated into their systems	Busy ED providers have access to a complete picture of the patient before beginning the encounter The PDMP data is now included as another piece of patient history available
Technical Impact	Integration with an HIE streamlines access from EHRs to the PDMP Leveraged PMIX architecture[12] via PMPi Successful HIE integration provides a model for HIEs nationwide to integrate with their PDMP	The use of ADT triggers was already in place to facilitate the compilation of a patient's EHR record within the HIE, and this process is able to leverage that connection

[11] Available from http://www.narxcheck.com/overview/narxcheck-score (Accessed March 21, 2013)
[12] The PMIX architecture is the underlying standard behind PMPi that facilitates PDMP interstate data sharing.

Area of Interest	Outcomes	Results
Clinical Impact	Easier access to PDMP data promotes more informed prescribing Analytical indicator saves prescribers time in determining whether further investigation is necessary	Providers are provided an early indicator as to whether special attention should be paid to a patient's controlled substance history: • 6% of patients seen in the Wishard ED were identified as at-risk (having a NARx Score ≥ 500)[13] This represents over 246 people in a one-month period • Of this group, 75% received no opioid prescription. That amounts to 180 potentially dangerous prescriptions that weren't written over a 30-day period • In 9% of the cases the system displayed an alert notifying providers that the patient had a NARx Score > 500
Driver of Adoption	Integration with standard technology, networks, and HIEs expands the availability of PDMP data to providers of all sizes	The inclusion of the PDMP data as a resource on IHIE provides immediate access to more than 25,000 physicians and over 90 hospitals

Metrics

Pre-implementation data represents activity that occurred between December 22, 2012 and January 22, 2013. Post-implementation data represents the period between January 23, 2013 and February 22, 2013.

Overall

Metric	Pre-Impl. Count	Post-Impl. Count	Impact
Total queries to INSPECT	132,579	210,400	↑ 59%

[13] For more information on NarxCheck scoring refer to the Analytics section above.

Design A

Metric	Pre-Impl.[14] Count	Post-Impl. Count	Impact
Number of ADT queries to the PDMP	7731	9109	↑ 18%
PDMP report returned	5295	4259	NOTE*
NARx report returned	N/A**	4259	
NARx Score over 500	N/A**	246	
# of visits with NARx > 500 where INSPECT was accessed	N/A**	72	
Average NARx Score	N/A**	177	
% of time narcotics were prescribed for patient with score > 500	N/A**	25%	
# of prescribers accessing CareWeb and clicking on INSPECT	694	866	↑ 25%

*Blank cells indicate no prior categories for baseline or data is provided for comparison purposes only.
** NARx reporting is a new capability and therefore no pre-implementation exists.

Design B

Metric	Pre-Impl. Count	Post-Impl. Count
Number of ADT queries to the PDMP	N/A*	60000
PDMP report returned	N/A*	30000
# of prescribers accessing CareWeb and clicking on INSPECT	N/A*	1038

*ADT triggering is new functionality and therefore no pre-implementation data exists.

An Eye to the Future

The implementation will remain in use after the end of the evaluation period. The following are plans for expansion:

- Developing a graphic indicator of PDMP data available on the ED intake board.
- Expansion to other HIEs operating in Indiana such as Michiana Health Information Network (MiHIN).

[14] Impl. = Implementation

In their own words . . .

"Having the INSPECT data separate from the medication story is helpful. We initially talked about integrating it into one view. Having the Narxcheck report and the 3 scores further separated out is helpful. As a clinician I have a directed question and need to go to the right resource. Being jumbled together would make that difficult. We think this is better for patient care."

John T. Finnell, M.D. MSc

- Director and Associate Professor, Health Informatics
- Research Scientist, Regenstrief Institute

"When I was a resident I used INSPECT less than 5 times. Now I use the system regularly since it is so much easier to access the data. If I hear particular chief complaints, it triggers a though process for me. In the last month there have been 5-10 times where I click the button [access to INPC Careweb], print the report, and bring it in with me when talking to the patient. If the story is not adding up, I pull out the report and say can we talk about this. This has been really great and I love having this data."

Jason Schaffer, M.D.
Methodist Emergency Department

"Going into INSPECT before was a full thought process of - I need to go look for this information. We are in CareWeb almost all of the time looking up clinical history information and now INSPECT is there right in front of you – much more usable and available. It is a better screening tool than having to go out and look for this information. I access the information very early in the patient interaction . . . Using this information as a screening tool saves time and changes the patient interaction."

Indiana Implementations

"One or Two Clicks" access to PDMP **data**

"CareWeb was our primary information resource where we trained for our residency . . . It is an essential source of clinical information from surrounding hospitals to not repeat radiology and lab testing and have previous admission and discharge notes.. Now taking two resources and combining them into one location with the "one click" to access CareWeb and the INSPECT data."

Ryan Gethers, M.D.
Tomohiro Oshimura, M.D.
Andrea Volz, M.D.
Indiana University West Emergency Department

In their own words . . .

Dan Rusyniak, M.D.
Wishard Emergency Department

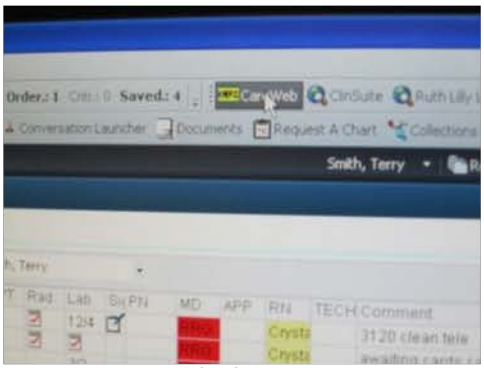
"INSPECT is awesome! If you take it away, there would be trouble. Emergency physicians have been in a difficult situation for the last 10 years. There is very little patient information and then we have this burgeoning epidemic of prescription drug use, abuse and death, coupled with this one-to-one patient relationship where the physician is trying to help patients in pain. Really what our new program [access to INSPECT data] provides us a better ability to assess risk. It is really not any different from understanding the patient's cholesterol and their risk for heart disease, no different than understanding the patient's hemoglobin A1C and their risk for diabetic complications. This helps us identify a risk factor for a life threatening disorder - that is death or complications from prescription drugs. And we want this information pushed to the physicians."

Randall Todd, M.D.
St. Francis Emergency Department

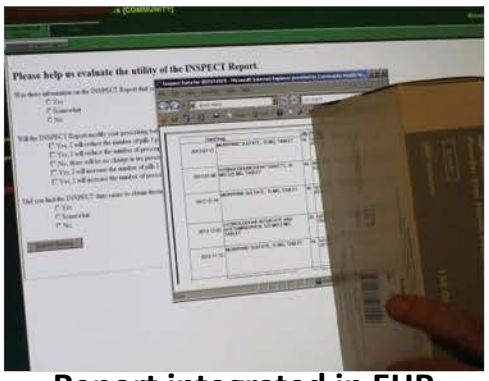
"Everybody loves it and is very excited to have it. On Sunday I saw a woman having chronic pain. She gave me a story, and I went into INPC and saw that she had received pain medication from six different prescribers in January. I went into the room and told her that I saw she had received pain medication from six different prescribers in one month. This is why we cannot give you anymore pain medication."

Indiana Implementations

"One or Two Clicks" access to PDMP **data**



One click to view



Report integrated in EHR

Providers see scores and a graph summarizing the patient's PDMP history

Overview

Kansas maintains one of the prescription drug monitoring programs (PDMPs), Kansas Tracking and Reporting of Controlled Substances (K-TRACS), authorized to provide unsolicited reports to providers who have either prescribed or dispensed controlled substances to patients at risk for prescription drug abuse. This process, while effective in concept, is time consuming and cumbersome resulting in a large burden on the small PDMP staff. Furthermore, providers and dispensers receive these alerts through the US Mail and are legally unable to store them in the patient's record. This makes it difficult to associate the PDMP information with the patient at the time he/she is being seen. Additionally, this process is exteremly time consuming; consequently, paper reports are only sent out on a quarterly basis. The goal of this implementation was to automate the unsolicited reporting process for the Kansas PDMP by converting it to an electronic process so that PDMP data can be made more readily available to providers and dispensers.

Currently, an unsolicited report file is generated by the PDMP on a quarterly basis to produce the paper reports. This implementation continued to use the same report file; however, an open source toolkit split the file into individual electronic reports, which were delivered to the recipients' electronic health record (EHR) based in-box via DIRECT[15] messaging. The provider received a message in their in-box with a letter from the PDMP and reports for each individual designated as at risk by the PDMP.

As a result of this implementation, the Kansas PDMP was able to generate 64 electronic reports over a 6 week period. The reporting interval for these reports was reduced from 3 months to 2 weeks, significantly decreasing the time interval for alerting the providers of potential at risk patients. Kansas is currently encouraging other providers and dispensers to establish DIRECT email capabilities so that they too can begin to receive alerts directly into their EHR systems. A key lesson learned from this implementation was the value of having the unsolicited report delivered directly into an EHR based in-box to provide improved patient context.

Implementation Design

The Kansas unsolicited reporting implementation sent proactive, secure messages containing PDMP data via DIRECT to ambulatory care providers and dispensers in Kansas and Missouri for patients identified as at risk by the PDMP (Figure 5). The Kansas PDMP sent the report every two weeks via one large Portable Document Format (PDF) file. This implementation leveraged an intermediary, the Collaborative for Universal Health (C4UH), who produced an open source software toolkit that converted structured data into PDFs, manipulated the PDF report returned from the PDMP and endorsed the use of DIRECT, a secure messaging technology.

[15] The Direct Project was created to specify a simple, secure, scalable, standards-based way for participants to send authenticated, encrypted health information directly to known, trusted recipients over the Internet. Source: http://www.healthit.gov/policy-researchers-implementers/direct-project

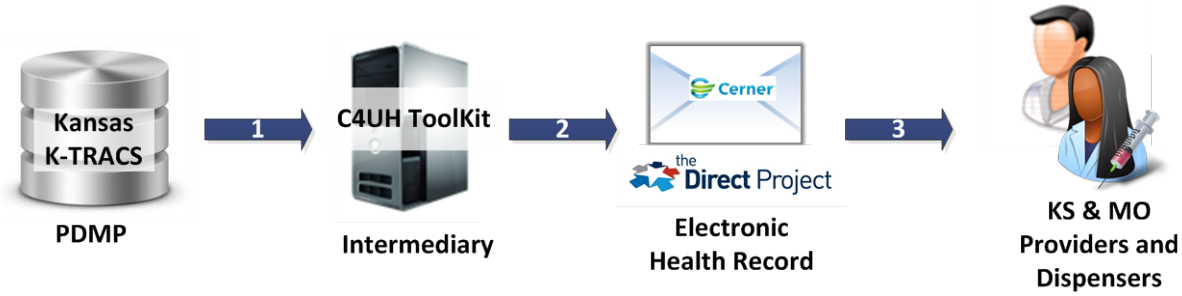


Figure 5: Kansas Workflow

1) The Kansas PDMP runs a threshold report and transmits a PDF file of PDMP reports to the C4UH ToolKit, which parses the files and converts them to individual PDF files
2) C4UH ToolKit transmits the PDF files to the EHR (Cerner)
3) Cerner delivers the PDMP letters securely to Kansas and Missouri prescribers' and/ or dispensers' inboxes using DIRECT

Implementation Participants

Name	Description
Cerner	System providing DIRECT and EHR capabilities
Collaborative for Universal Health (C4UH)	Third-party intermediary (C4UH Toolkit)
Kansas PDMP (K-TRACS)[16]	Kansas Prescription Drug Monitoring Program
LaFene Student Health Center at Kansas State University	Multi-service student and associate health center on campus of Kansas State University with both prescribers and dispensers
Lawrence Memorial Hospital	Community hospital with clinics in Lawrence and Douglas Counties in Kansas
Heartland Health	Integrated Health System in Missouri with coverage across NW Missouri and North Kansas City
Cerner Clinics (2)	Cerner on-site clinics

Technical Integrations Required

Integration	MOU	Data Exchange
K-TRACS -> C4UH Toolkit	Yes	Single batch report file from K-TRACS to C4UH
C4UH Toolkit -> Cerner HISP[17]	Yes	Individual report files from C4UH to Cerner HISP

[16] This is the entity that authenticated an individual to access PDMP information.

Integration	MOU	Data Exchange
Cerner HISP -> Secure Message Center in Cerner EHR	No	Secure mail message with K-TRACS report to DIRECT Secure Message Center

Standard Characteristics

Name	Response
Single Sign-On *User identification information is passed to other systems without re-entry of the data*	Yes
Using Patient Context *Patient demographics are passed to other systems without re-entry of the data*	No
Involves DIRECT Messaging *DIRECT messaging is part of the implementation*	Yes
SAMHSA Grantee *Does the PDMP have a SAMHSA grant*	Yes
Query Trigger (ADT, Button Click, etc.) *Action that triggers the PDMP query for patient prescription history information*	None – Unsolicited reports
Query Interface (PMPi, Open Interface, etc.) *Technology used to query the PDMP*	None
Implementation User Base *Role of the implementation participants*	Prescribers and dispensers
Phase 1 Pilot Participant	No

Legal Considerations

Name	Response
Can PDMP data persist in another system (EHR)?	No
Can a doctor legally delegate PDMP access?	N/A

Outcomes

The Kansas implementation provided benefits for providers and dispensers and the Kansas PDMP. Providers received proactive PDMP notifications bi-weekly and directly into their EHR-based DIRECT inbox. The Kansas PDMP was able to automate their unsolicited reporting process and eliminate the use of paper. The result of this was the ability to send the reports more frequently and reduce the burden on PDMP staff.

[17] Health Information Service Provider

Area of Interest	Outcomes	Results
Ease of Use	Easier for PDMP staff to automate report generation and eliminate monthly mailings Reduced the risk of paper reports not making it to the physician	Time savings realized as a result as a result of more efficient unsolicited reporting will allow PDMP staff to further explore ways to enhance their solicited reporting functionality. Reporting cycle reduced from quarterly to bi-weekly.
Fit with Workflow	Allows prescribers to see the PDMP "alert" reports in their current system as part of their normal activities Reduces, and does not add to, clinical overhead for accessing PDMP data	Prescribers and dispensers were more likely to view unsolicited reports when sent to DIRECT inbox within the EHR (versus paper)
Technical Impact	No changes to PDMP software required Allows for the automation of cumbersome process	The new process took a cumbersome paper process and automated it without requiring any changes to either the PDMP or any receiving prescriber or dispenser's system
Clinical Impact	Results in the ability to send out unsolicited reports on a shorter interval	Reporting period went from 3 months to 2 weeks. • 45 patients triggered the unsolicited report threshold for the Kansas participants • 18% of prescribers received letters on more than one patient
Driver of Adoption	No barriers to entry other than access to a DIRECT inbox	DIRECT is an open source product that is being embraced by HIEs and other health IT; this solution is scalable and extensible across the nation

Metrics

The evaluation period for this implementation was January 28, 2013 through February 25, 2013.

Metric	Source/Calculation	Pre-Impl. [18] Count	Post-Impl. Count
# Patients Affected	K-TRACS	N/A*	45
Total Threshold Letters Sent	K-TRACS	N/A*	64
# Prescribers Receiving Letter	K-TRACS	N/A*	38

*This information only pertains to the implementation and therefore no pre-implementation data exists.

[18] Impl. = Implementation

An Eye to the Future

The implementation will remain in use after the end of the evaluation period. The following are the plans for expansion:

- Meet with Kansas Board of Pharmacy and Lawrence Memorial Hospital to discuss a project to enable the EHR to directly query K-TRACS
- Work with Kansas Board of Pharmacy to educate stakeholders about the project and progress thus far
- Incorporate alerts into the EHR
- Provide triggered queries in addition to the unsolicited reports

Kansas Implementation

KANSAS STATE UNIVERSITY

Heartland Health

LAWRENCE MEMORIAL HOSPITAL

In their own words . . .

The Value of the implementation:

"We are doing the right thing getting secure email in the face of the physician"

"Showing early. Challenging early."

Using the data:

"…good info in…good info out....can I trust it, can I utilize it?"

-Sabrina Pruitt, MD

"It's always a challenge to figure out who has that one piece of information…"
"It's a real problem that we can't save this data to the chart."

-Joe Boyce, MD

Pathways to treatment:

"We don't' have a good model for this. We don't have the interventional policies to fix this."

LaFene Student Clinic; Heartland Health; Lawrence Memorial Hospital; Cerner Clinics

the Direct Project

K-TRACS

This pilot demonstrated the feasibility and value of combining a progressive PDMP, open source software, government-led health IT initiatives and a committed EHR partner to bring PDMP information directly to providers

Cerner

C4UH

Michigan/Indiana/Ohio - ePrescribing

Overview

Providers in Michigan using the DrFirst ePrescribing software were part of a 2012 pilot that explored the inclusion of the Prescription Drug Monitoring Program (PDMP) data in the ePrescribing workflow. Physicians use DrFirst's Rcopia software to record and process electronic prescriptions. Prior to any pilot, when physicians accessed the PDMP, reports could take up to two days to receive. The Phase 1 pilot leveraged the DrFirst Rcopia software to send a query to Michigan's PDMP, MAPS, and displayed the resulting data to the physician in the same screen being used to prescribe. By providing the PDMP data within the ePrescribing workflow, prescribers could rely on the system's existing notification capabilities to indicate when a patient might be at risk for prescription drug abuse. The original pilot proved the value of having a patient's complete controlled substance prescription history available when making prescribing decisions.

The goal of the 2013 implementation was to explore the impacts of expanding the integrated functionality to providers in other states. This expansion addressed both the scalability of the system and the impacts of integrating multi-state data. The original 2012 pilot used an interstate PDMP data sharing hub, Prescription Monitoring Program InterConnect (PMPi), as an intermediary for access to the Michigan PDMP. The new implementation expanded the existing connection to include the additional states of Indiana and Ohio. While including other states was not technically difficult, legal agreements had to be established between DrFirst and each of the additional state PDMPs to outline authorized users of the information.

As a result of this implementation, 231 prescribers received multi-state PDMP data in their existing prescribing workflow. The new system generated almost 23,000 total queries to the three PDMPs over a one month period. These queries resulted in just under 2,500 PDMP reports being returned to providers. DrFirst is currently planning to expand this functionality nationwide and the participating PDMPs are looking forward to working with other ePrescribing providers as they become authorized for ePrescribing of controlled substances.

Implementation Design

This implementation expands on a 2012 pilot by using the e-prescribing activity in DrFirst's Rcopia software to initiate queries to two additional state PDMPs. Specifically, DrFirst enhanced Rcopia to query the Michigan, Indiana, and Ohio PDMPs via the NABP PMPi interstate exchange hub for the patient's PDMP data (i.e., controlled substance prescription history) (Figure 6). These states were selected for their proximity to one another and ability to execute an agreement with DrFirst. Rcopia displayed the data to the prescribing physician so that he/she could determine the most appropriate course of treatment. Rcopia also has a built in alert triggered by duplicative medications, including those obtained from the PDMP and other medication history sources.

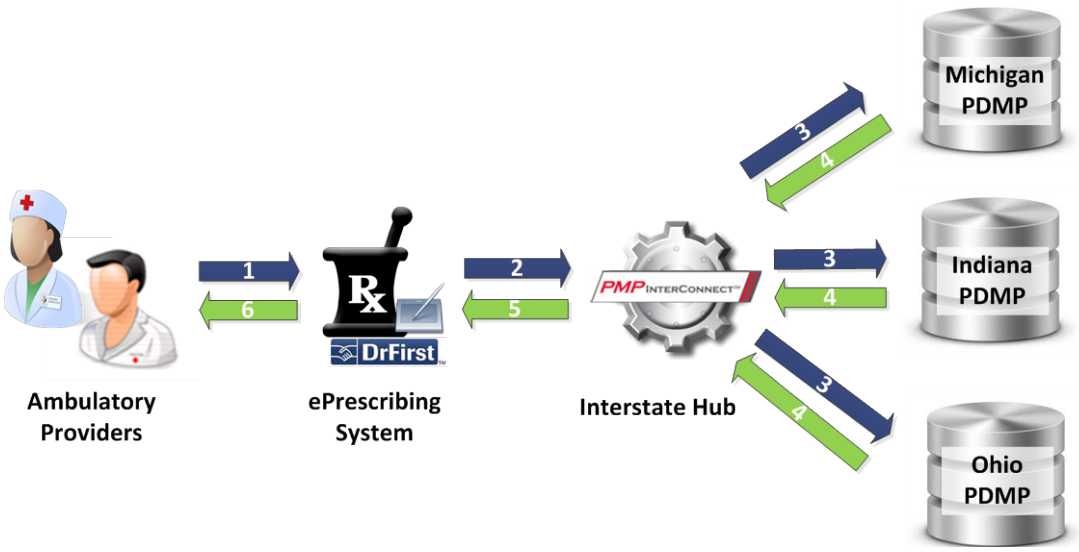


Figure 6: ePrescribing Workflow

1) Physician accesses the DrFirst ePrescribing software during the patient encounter
2) The ePrescribing software automatically generates a query for PDMP data via PMPi
3) PMPi automatically queries the Indiana, Ohio, and Michigan PDMPs for a patient's information
4) The PDMPs return available data to PMPi
5) PMPi aggregates the information and returns the data to the ePrescribing software
6) If duplicative medications are found, the system triggers an alert to the provider

Implementation Participants

Name	Description
Michigan PDMP (MAPS)	Michigan Prescription Drug Monitoring Program
Ohio PDMP (OARRS)	Ohio Prescription Drug Monitoring Program
Indiana PDMP (INSPECT)	Indiana Prescription Drug Monitoring Program
Ambulatory Providers	Ambulatory providers in Michigan, Ohio and Indiana
DrFirst[19]	ePrescribing software
NABP/PMPi	The National Board of Pharmacy (NABP) PMP InterConnect facilitates the transfer of prescription monitoring program (PMP) data across state lines to authorized users.

[19] This is the entity that authenticated an individual to access PDMP information.

Technical Integrations Required

Integration	MOU	Data Exchange
DrFirst ↔ PMPi	Yes	XML PDMP data to ePrescribing system
PMPi ↔ PDMPs (OH, IN, MI)	Yes	Existing connection

Standard Characteristics

Name	Response
Single Sign-On *User identification information is passed to other systems without re-entry of the data*	Yes
Using Patient Context *Patient demographics are passed to other systems without re-entry of the data*	Yes
Involves DIRECT Messaging *DIRECT messaging is part of the implementation*	No
SAMHSA Grantee *Does the PDMP have a SAMHSA grant*	No
Query Trigger (ADT, Button Click, etc.) *Action that triggers the PDMP query for patient prescription history information*	Upon opening of ePrescribing software
Query Interface (PMPi, Open Interface, etc.) *Technology used to query the PDMP*	PMPi
Implementation User Base *Role of the implementation participants*	Ambulatory providers in OH, IN, MI
Phase 1 Pilot Participant	Yes

Legal Considerations

Name	Response
Can PDMP data persist in another system (EHR)?	N/A
Can a doctor legally delegate PDMP access?	Yes

Outcomes

Physicians appreciated the complete picture of a patient's controlled substance history as a separate data element to more easily scan for signs of abuse or misuse. The success of the scalability means in the near-term DrFirst can continue to roll out this solution to other customers while in the future other ePrescribing vendors can leverage the same design and seek to achieve similar results.

Area of Interest	Outcomes	Results
Ease of Use	Easier for prescribers to view patient data at the appropriate point in the encounter Easier to determine if a patient has been receiving similar prescriptions in other states	22,397 queries were made to the PDMP using this new integration Providers currently using ePrescribing software now have a complete patient prescription picture, including payer and cash funded transactions 1% of individuals queried had prescription drug data in multiple states
Fit with Workflow	Allows prescribers to see the PDMP information in their current system as part of their normal activities Reduces, does not add to, clinical overhead for accessing PDMP data	Providing prescription history at the point where a new prescription is being written makes the information extremely timely, thus increasing its value
Technical Impact	No changes to PDMP software required	This integration used an existing connection to the PMPi interface
Clinical Impact	Results in appropriate engagement of an individual, where necessary	Alerts are triggered to providers for a patient where overlapping prescriptions are being filled. This proactively aids in the prevention of excessive prescriptions being written for potential abusers 11% of all patients seen had prescription drug data in at least one of the PDMPs queried
Driver of Adoption	No barriers to entry for end-users currently using an eRx system Serves as a “roadmap” for eRx system vendors to add PDMP capability to their products	The model is extensible to other certified ePrescribing systems and states with interstate data sharing

Metrics

The collection period was from February 15, 2013 to March 8, 2013, and represents implementation participants using DrFirst’s ePrescribing solution, RCopia. The intent of this implementation was to directly integrate PDMP data into an ePrescribing solution and to evaluate the impact of interstate data sharing. Prior to this implementation, there were no models for ePrescribing and no measurements available for interstate data access, therefore no “pre” data is included.

Metric	Source	Pre-Impl.[20] Count	Post-Impl. Count
Number of prescribers making multi-state queries using RCopia (MI, OH, IN)	DrFirst	N/A*	MI-225 OH-1 IN-5
Total number of controlled substance medication history queries from RCopia	DrFirst	N/A*	22,397
Number of queries that return prescription history data from at least one state	DrFirst	N/A*	2,413
Number of queries that return prescription history data from more than one state	DrFirst	N/A*	23
Total number of controlled substance prescriptions written electronically by end users	DrFirst	N/A*	4,311
Total number of controlled substance prescriptions written by prescribers that had patient records, including any results from a participating PDMP	DrFirst	N/A*	576
Total number of controlled substance prescription written by prescribers that had patient records, including an exact drug match result from a participating PDMP	DrFirst	N/A*	160

*This is new functionality for these providers therefore no pre-implementation data exists.

An Eye to the Future

The implementation will remain in use after the end of the evaluation period. The plan for expansion is to enable access to DrFirst clients nationwide.

[20] Impl. = Implementation

Michigan Implementation

DrFirst Rcopia

In their own words . . .

Providers and the problem:

"It's upsetting because you feel like you have been taken advantage of, you trusted this person, they seem like they are legit….it's not just young people, it's older people too"

"It's been kind of eye-opening for the entire staff"

Patient Stories:

"We had one guy who swore he was taking his medications, he had us call the pharmacy….said someone was switching medications on that end….he just would not admit that there was a problem…..his wife was there with him saying 'Yes, he takes his medication every day'……just regular people no signs or symptoms that would make you think they are lying to you."

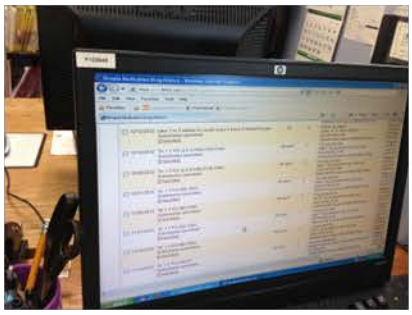
Using the data:

"We have had the reverse, we have had patients who we are sure they are doing wrong, and everything comes out OK….we are the only doctor [prescribing]"

The Value of the implementation:

"This tool will be great if [the PDMP data] can actually show up when we prescribe. I think it could be really helpful"

Nurse now access PDMP data ***integrated*** in their ePrescribing software



PDMP data is available ***before*** the ePrescribing process concludes

Nebraska

Overview

Mary Lanning Memorial Hospital (MLMH) is a rural 142 bed hospital serving central Nebraska. Currently, their providers are encouraged to access the Nebraska prescription drug monitoring program (PDMP) prior to prescribing any controlled substances; however, the process is not easy. Prior to the implementation, providers logged into the Nebraska PDMP (NeHII) through a separate interface outside the hospital's electronic health record (EHR) system. Most emergency department (ED) providers did not have access to user accounts for NeHII and if they did, they had to manually enter patient information to conduct a search. As a result, very few providers actually viewed a patient's controlled substance history in the PDMP before prescribing. The goal of this implementation was to achieve easier, more streamlined access to PDMP data for providers through seamless integration into the existing ED workflow.

The implementation was designed to provide automatic access to the PDMP report from the EHR while the providers review the patient's medical history. Providers were able to push a button within the EHR and retrieve a PDMP report via NeHII. The new process is expected to be more efficient, allow easier access, and securely deliver PDMP information at the point of care. It will eliminate the need for each provider to have multiple user logins and provide the PDMP information alongside other medical records available through NeHII.

The implementation completed and successfully tested the technical modifications necessary for MLMH to Nebraska PDMP integration during this implementation period. However, due to unforeseen data access issues, ED providers were not able to use the new capabilities at the time this report was prepared. The providers at MLMH look forward to adopting the new functionality and increased access to patient drug history information. Despite this temporary setback other hospitals have already requested the implementation be provided for their use.

Implementation Design

This implementation connected the Nebraska PDMP to MLMH via NeHII; the Nebraska PDMP is housed within NeHII (Figure 7). Specific components of the design included:

- The design leverages the use of single sign-on functionality to eliminate multiple accounts and logins.
- Physicians have the choice of requesting a PDMP report, but if they do it is a single click and the information is presented in a pop-up window.

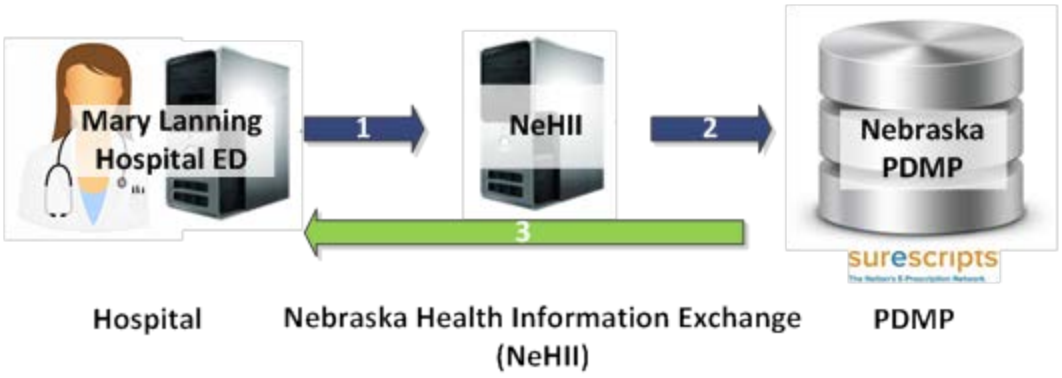


Figure 7: Nebraska HIE Workflow

1) Patient presents at the ED where the physician reviews the records using an EHR system with a hyperlink to request controlled substance history information from NeHII
2) The request for controlled substance history and all necessary patient information is routed from NeHII to its data store, Surescripts
3) NeHII returns the full controlled substance information for the patient to the EHR. The EHR presents the information to the provider in a pop-up window

Implementation Participants

Name	Description
Mary Lanning Memorial Hospital (MLMH)	ED physicians and staff
NeHII[21]	Nebraska health information exchange (HIE) and PDMP
ePowerDoc	EHR vendor for MLMH
Surescripts	NeHII uses Surescripts prescription history as PDMP data

Technical Integrations Required

Integration	MOU	Data Exchange
EHR ↔ NeHII	Yes	EHR to NeHII, patient prescription history request
NeHII↔ Surescripts	Yes	NeHII to Surescripts, patient prescription history request Surescripts to NeHII, prescription history report

[21] This is the entity that authenticated an individual to access PDMP information.

Characteristics

Name	Response
Single Sign-On *User identification information is passed to other systems without re-entry of the data*	Yes
Using Patient Context *Patient demographics are passed to other systems without re-entry of the data*	Yes
Involves DIRECT Messaging *DIRECT messaging is part of the implementation*	No
SAMHSA Grantee *Does the PDMP have a SAMHSA grant*	No
Query Trigger (ADT, button click, etc.) *Action that triggers the PDMP query for patient prescription history information*	Button click in EHR
Query Interface (PMPi, Open Interface, etc.) *Technology used to query the PDMP*	National Council for Prescription Drug Programs (NCPDP) Script
Implementation User Base *Role of the implementation participants*	ED physicians
Phase 1 Pilot Participant	Yes

Legal Considerations

Name	Response
Can PDMP data persist in another system (EHR)?	No
Can a doctor legally delegate PDMP access?	No

Outcomes

The implementation completed and successfully tested the technical modifications necessary for the MLMH to Nebraska PDMP integration during this pilot period. However, due to unforeseen data access issues, providers were not able to take advantage of the new capabilities at the time this report was prepared.

Area of Interest	Expected Outcomes	Anticipated Results
Ease of Use	Prescribers will have seamless access to the PDMP using their EHR system	Availability of PDMP data in the EHR will increase the likelihood that busy ED physicians will access the information

Area of Interest	Expected Outcomes	Anticipated Results
Fit with Workflow	Providers have the opportunity to view the PDMP data within their EHR systems	The number of queries to the PDMP and the number of times the provider looks at the returned PDMP data will increase
Technical Impact	Integration with an HIE will streamline access from EHRs to the PDMP Successful HIE integration will provide a model for HIEs nationwide to integrate with their PDMP	The HIE serves as a hub that has already connected providers to disparate sources of data; adding the PDMP is a single step that can be replicated for all HIE members Outsourcing the PDMP to a third party introduces the risk of interrupted PDMP data access, loss of control of the PDMP, gaps in prescription drug transactions paid for in cash, and unanticipated costs for providing access to PDMP data
Clinical Impact	Easier access to PDMP data will promote more informed prescribing	A pop-up window with PDMP data will provide the information in the patient context Allowing clinicians to use their EHR system to access additional health data such as that from PDMPs enables them to make more informed clinical decisions
Driver of Adoption	Integration with standard technology, networks, and HIEs will exponentially expand the availability of PDMP data to providers of all sizes	Reliance on third-party data sources for PDMP data presents risks to availability

An Eye to the Future

The implementation is expected to be used in the Mary Lanning hospital as soon as PDMP data is once again available. The following are also plans for expansion:

- Expand implementation access to all physicians and approved medical staff using the HIE
- Expand HIE membership to all physicians
- Acquire a more reliable and comprehensive (all pharmacies and interstate) source of prescription history information
- Develop alerts or flags for patient prescription misuse issues

Oklahoma

Overview

Secure Medical Records Transfer Network (SMRTNet) is an Oklahoma City based health information exchange (HIE) that consistently explores new ways to provide additional value to its members. One data source of interest to SMRTNet members was the Oklahoma PDMP. Prior to the implementation, providers in Oklahoma manually logged in to the PDMP through a web portal and entered certain information about a patient to request a report. While the data stored in the Oklahoma PDMP is some of the most up-to-date in the nation, the time it takes to retrieve a report can be an impediment. The goal of this implementation was to integrate the Oklahoma PDMP data with the SMRTNet HIE to provide seamless access for HIE members.

This implementation was designed to show the value and viability of integrating a PDMP with a HIE to enable clinicians to view PDMP data with other patient data from other sources. This implementation used an existing standard interface developed for Oklahoma in anticipation of an integration of this type. This precluded the need for an intermediary but did require additional development to prevent the providers from having to log in to two separate systems: SMRTNet and the PDMP. Ultimately, this implementation successfully built and tested a robust capability for sending the necessary login information from SMRTNet to the Oklahoma PDMP automatically.

While this new functionality has not been placed into production, the SMRTNet performed extensive testing and participating providers are very excited about the new information that will be available to them in their HIE. Production deployment of this new technology is awaiting legislative approval which is expected to come in early August. The necessary legislation will authorize third party providers such as the SMRTNet HIE to access the PDMP.

Implementation Design

This implementation demonstrated integration of the Oklahoma PDMP with SMRTNet. Electronic Health Record (EHR) systems using SMRTNet for secure bi-directional communication will now have seamless access to controlled substance prescription data in the Oklahoma PDMP (Figure 8). The design uses single sign-on (SSO) functionality for both SMRTNet and the Oklahoma PDMP to eliminate multiple system logins. SMRTNet also used a flag to convey if a patient is designated by the state PDMP as potentially at risk for prescription drug abuse or misuse. Should the provider seek further information, the full PDMP report will be available.

Figure 8: Oklahoma Workflow

1) A physician reviews a patient's health record located on the SMRTNet HIE using a secure link in their organization's EHR software
2) SMRTNet triggers a request to the PDMP for the patient's controlled substance history using the patient and physician identification information
3) The Oklahoma PDMP returns its data to the HIE's patient health record. The system displays a threshold flag if the patient has seen 5 doctors and 5 pharmacies in the past 30 days. Full prescription information for the identified patient is also available
4) Physician views the PDMP data as part of the SMRTNet health record

Implementation Participants

Name	Description
Norman Regional Health System	ED physicians at Norman Regional
Oklahoma Heart Hospital	ED physicians at Oklahoma Heart
Yeaman Signature Health Clinic	Primary care physicians group
SMRTNet	HIE connecting other participants
Oklahoma PDMP[22]	Housed in the Oklahoma Bureau of Narcotics
EHRs	eClinicalWorks, Cerner EHR, Meditech

Technical Integrations Required

Integration	MOU	Data Exchange
PDMP ↔ HIE	Yes	HIE to PDMP, patient prescription history request PDMP to HIE, patient prescription history report and flag
EHR ↔ HIE	Yes	EHR to HIE, patient and provider context

[22] This is the entity that authenticated an individual to access PDMP information.

Standard Characteristics

Name	Response
Single Sign-On *User identification information is passed to other systems without re-entry of the data*	Yes
Using Patient Context *Patient demographics are passed to other systems without re-entry of the data*	Yes
Involves DIRECT Messaging *DIRECT messaging is part of the implementation*	No
SAMHSA Grantee *Does the PDMP have a SAMHSA grant*	No
Query Trigger (ADT, button click, etc.) *Action that triggers the PDMP query for patient prescription history information*	Patient record review in HIE
Query Interface (PMPi, Open Interface, etc.) *Technology used to query the PDMP*	Custom web service interface
Implementation User Base *Role of the implementation participants*	Primary care physicians and ED physicians
Phase 1 Pilot Participant	No

Legal Considerations

Name	Response
Can PDMP data persist in another system (EHR)?	No
Can a doctor legally delegate PDMP access?	No

Outcomes

The implementation completed and successfully tested the technical modifications necessary for SMRTNet to integrate with the Oklahoma PDMP. However, due to legislative issues encountered within the state of Oklahoma, the implementation did not exchange live patient data and was unable to collect metrics. Oklahoma House Bill 1419 permitting the connectivity between the Oklahoma PDMP and SMRTNet passed in the House with a vote of 87 to 0 on March 18, 2013. The bill is now being processed in the Senate.

Area of Interest	Intended Outcomes	Anticipated Results
Ease of Use	Prescribers will have seamless access to the PDMP using their EHR system	Easy access to PDMP data in the patient context enables providers to prescribe with confidence for their repeat patients

Area of Interest	Intended Outcomes	Anticipated Results
Fit with Workflow	Providers have the opportunity to view the PDMP data within their EHR systems	The number of queries to the PDMP and the number of times the provider looks at the returned PDMP data will increase
Technical Impact	Integration with an HIE will streamline access from EHRs to the PDMP Successful HIE integration will provide a model for HIEs nationwide to integrate with their PDMP	The HIE serves as a hub that has already connected providers to disparate sources of data; adding the PDMP is a single step that immediately gives access to all HIE-connected providers
Clinical Impact	Easier access to PDMP data will promote more informed prescribing	An alert generated based on the availability of PDMP data can make providers aware that the PDMP contains information that may indicate potential abuse
Driver of Adoption	Integration with standard technology, networks, and HIEs will exponentially expand the availability of PDMP data to provider practices of all sizes	PDMPs housed in non-health-related departments (i.e., Justice) can be opened to the medical community in an efficient and effective way Integrating PDMP data access with an existing HIE or EHR authentication model can present legislative challenges

An Eye to the Future

The implementation is expected to begin accessing production PDMP data immediately upon legislative approval. The following are also plans for expansion:

- Expand PDMP access to all physicians and approved medical staff using the HIE and include other HIEs in Oklahoma
- Increase PDMP data access to include PDMP data from other states
- Improve clinical usefulness of the PDMP status alert flag
- Investigate ways of managing information overload with the HIE user interfaces
- Reuse of the same technology to support access to the Kansas PDMP (K-TRACS) through a statewide HIE

Oklahoma Implementation

Dr. Kevin O'Brien, M.D.
Alex Benson, CERNER

In their own words . . .

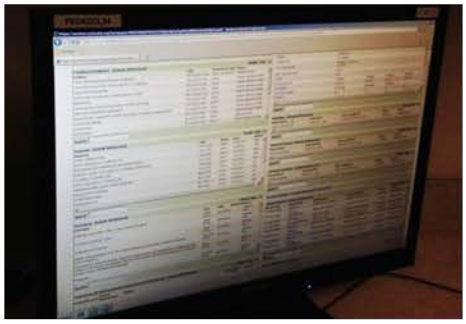
"As family physicians we are even in a more difficult position, because the surgeons take care of them….but then they are in pain and come back and see us …we get stuck with long term pain management, we are not geared up like a pain management …we do not have the time"

"When you are checking and the only prescriber is you , at least you know that they are not going around to other physicians using their name"

"A young lady came to see me …she had a condition that caused ischemia of the bowel and I was writing her pain scripts for her flares. She was hitting me right before the holiday…your busy, your nurse is busy….well, I got a call from a BNA agent about two weeks ago….this person is being investigated….I pulled up her PDMP report and she had gotten 600 pills in 30 days."

"You get lulled in some times and we do a pretty good job of checking the PDMP but a log in takes about 3-4 minutes...so it is great when I can get it within 20 seconds [with this pilot]"

Providers will access PDMP data ***directly*** in the EMR system



Providing the PDMP data on the HIE summary page will allow providers the added value of seeing all the patient's clinical history and PDMP data in one location

Tennessee

Overview

Tennessee is one of many states with a growing prescription drug abuse problem. In an effort to more effectively address the problem, Tennessee has invested significant resources in its prescription drug monitoring program (PDMP). On April 1, 2013, Tennessee enacted new state legislation requiring providers to check the PDMP prior to prescribing a controlled substance. Ensuring that providers were accessing the data was an important step, but Tennessee felt it could make the PDMP resource more effective by increasing the reliability of the data.

Tennessee's PDMP administrator was informed by several providers that they saw value in the data but did not always trust that it was up-to-date. Prior to the implementation, pharmacies reported dispensing information to the state PDMP on a weekly basis. Pharmacies reported this dispensing data by logging into the PDMP web portal from a separate interface outside the pharmacy software and uploading files or mailing a disk to the PDMP office. The goal of the Tennessee implementation was to explore the clinical impacts of providing real-time controlled substance prescription information to providers.

As part of this implementation, the Tennessee PDMP developed a capability to accept near real-time reporting from pharmacies. This implementation leveraged a reporting interface already in use by the state of Oklahoma. This new technology allowed the Tennessee PDMP to automatically receive controlled substance dispensing information from pharmacies to the PDMP when the patient picked up the prescription. This new process is expected to be more efficient, occur automatically during the pharmacy workflow, and securely deliver dispensing information to the PDMP. A key lesson learned from this process was the power to leverage the technical design in another state to promote rapid adoption of the new technology.

This implementation is intended to go live in Tennessee pharmacies shortly after the time this report will be released.

Implementation Design

The Tennessee real-time PDMP reporting implementation was designed to show the value and viability of reducing the time required for pharmacies to report controlled substance dispensing information to the PDMP. This implementation demonstrates the capability to integrate the PDMP with pharmacy systems for near real-time reporting of prescription dispensing data by reusing the information exchange specification developed by another state (Figure 9).

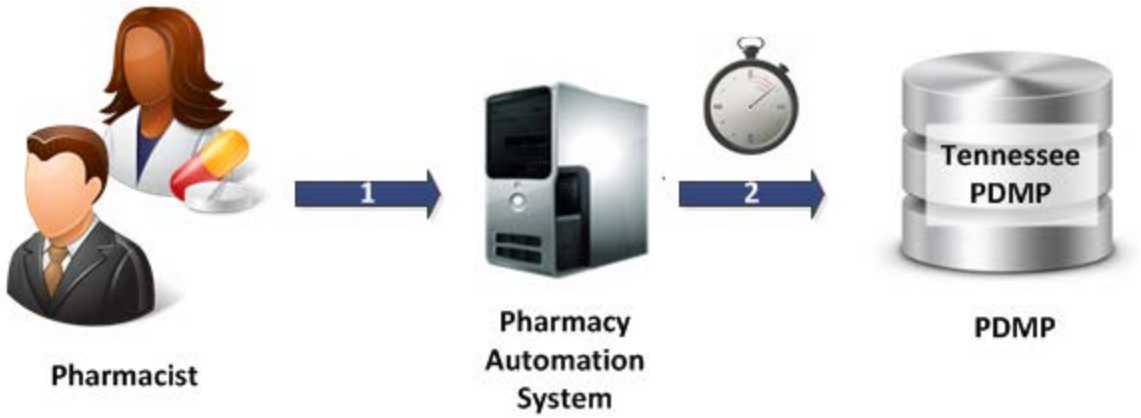


Figure 9: Tennessee Workflow

1) Patient presents at the pharmacy to pick up a prescription and pharmacist dispenses prescription
2) The pharmacy system automatically sends dispensing information to the PDMP based on the information in the pharmacy system within 5 minutes of the payment and pickup transaction (no actions are required by the pharmacist)

Implementation Participants

Name	Description
Reeves Sain Pharmacy	High-volume independent pharmacy
Tennessee PDMP[23]	Tennessee Controlled Substance Monitoring Database (CSMD)
ComputerRX	Pharmacy point of sale software vendor
Optimum Technology	PDMP software vendor

Technical Integrations Required

Integration	MOU	Data Exchange
PDMP ↔ Pharmacy Software	Tennessee Department of Health and Pharmacies	Pharmacy to PDMP - dispensing report PDMP to Pharmacy - acknowledge receipt of report

Standard Characteristics

Name	Response
Single Sign-On *User identification information is passed to other systems without re-entry of the data*	Yes

[23] This is the entity that authenticated a pharmacy to report PDMP information.

Name	Response
Using Patient Context *Patient demographics are passed to other systems without re-entry of the data*	Yes
Involves DIRECT Messaging *DIRECT messaging is part of the implementation*	TN National Health Information Network uses DIRECT, but the capability is not being used in a new or different way with the implementation.
SAMHSA Grantee *Does the PDMP have a SAMHSA grant*	No
Query Trigger (ADT, button click, etc.) *Action that triggers the PDMP query for patient prescription history information*	Not applicable
Query Interface (PMPi, Open Interface, etc.) *Technology used to query the PDMP*	Not applicable
Implementation User Base *Role of the implementation participants*	Pharmacist
Reporting Interval for Pharmacy *State statute requirement for dispensing reporting interval*	Within 5 minutes of dispensing
Processing Interval for PDMP *Frequency of processing dispensing reports from the pharmacies*	Near real-time
Phase 1 Pilot Participant	No

Legal Considerations

Name	Response
Can PDMP data persist in another system (EHR)?	No
Can a doctor legally delegate PDMP access?	Yes

Outcomes

The implementation completed, and successfully tested, the technical modifications necessary for real-time data reporting into the Tennessee PDMP. However, due to tight development timelines, no live patient data was reported and no metrics were able to be collected during the project period.

Area of Interest	Intended Outcomes	Anticipated Results
Ease of Use	Dispenser software automatically sends dispensing data to the PDMP at the time of dispensing	No change to the pharmacist workflow, but now data is reported in near real-time

Area of Interest	Intended Outcomes	Anticipated Results
Fit with Workflow	Automatic function of dispensing software without manual intervention by the pharmacist	No negative impact or change to pharmacy workflow as a result of new real-time information reporting
Technical Impact	Integration with pharmacy software will provide real-time reporting of PDMP dispensing actions Successful pharmacy integration with the PDMP will provide a nationwide model for real-time reporting of dispensing data	Pharmacy reporting software developed to meet the requirements of another state (Oklahoma) was reused with minimal modification to quickly enable pharmacies to adopt more frequent reporting processes A new web service interface can be added to a production PDMP to provide new capabilities, such as near real-time reporting of dispensing activities
Clinical Impact	Real-time PDMP data will promote more informed dispensing and prescribing	Physicians use the data with a high degree of confidence that they are seeing the most currently available controlled substance history of a patient Pharmacists can use the data to determine whether an intervention is needed (i.e. contacting the prescriber, speaking to the patient, etc.)
Driver of Adoption	Integration with standard technology, pharmacy benefit networks, and HIEs will exponentially expand the availability of PDMP data to providers of all sizes	A sharing of technologies between PDMPs can provide costs savings that may contribute to the sustainability of those organizations

An Eye to the Future

This implementation is expected go into production in Tennessee upon completion of the development . The following are additional plans for expansion:

- Expand implementation access to all pharmacies in Tennessee
- Expand PDMP data access to include integration with EHRs
- Improve clinical usefulness of PDMP data by integration with other health systems
- Investigate ways of managing information overload with alerts and flags

ACRONYMS

Acronym	Description
ADT	HL7 v2 Admission, Discharge, and Transfer
ASAP	American Society for Automation in Pharmacy
C4UH	Collaborative For Universal Health
CDC	Centers for Disease Control and Prevention
DIRECT	Secure messaging solution
ED	Emergency Department
EHR	Electronic Health Record
EMR	Electronic Medical Record
EPCS	ePrescribing of Controlled Substances
GOTS	Government Off-the-Shelf
Health IT	Health Information Technology
HIPAA	Health Insurance Portability and Accountability Act
HIE	Health Information Exchange
HISP	Health Information Service Provider
HL7	Health Level Seven International
IHIE	Indiana Health Information Exchange
IL	Illinois
INSPECT	Indiana Scheduled Prescription Electronic Collection & Tracking Program
KS	Kansas
K-TRACS	Kansas Tracking and Reporting of Controlled Substances
MAPS	Michigan Automated Prescription System
MLMH	Mary Lanning Memorial Hospital
NABP	National Association of Boards of Pharmacy
NarxCheck	Third party PDMP data analysis solution
NCPDP	National Council for Prescription Drug Programs
NeHII	Nebraska Health Information Initiative
NIEM	National Information Exchange Model
OARSS	Ohio Automated Rx Reporting System
ONC	Office of the National Coordinator for Health Information Technology
PDF	Portable Document Format
PDMP	Prescription Drug Monitoring Programs
PHI	Protected Health Information
PMPi	Prescription Monitoring Programs Interconnect

SAMHSA	Substance Abuse and Mental Health Services Administration
SMRTNet	Secure Medical Records Transfer Network
SSO	Single Sign-On
XML	Extensible Markup Language