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RESEARCH

Prescription drug monitoring program use and utility by Washington State pharmacists: A mixed-methods study

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ABSTRACT

Objectives: To explore factors and situations that influence pharmacists to use the prescription drug monitoring program (PDMP) and to characterize actions taken by pharmacists after alarming scenarios from a PDMP query.

Design: Explanatory sequential 2-phase mixed-methods design: (1) cross-sectional Web-based survey of Washington State pharmacists followed by (2) interviews with purposefully selected respondents to explore statistically significant quantitative findings.

Setting and participants: The study was conducted in Washington State from September 2018 to February 2019. A total of 967 Washington State pharmacists from various practice settings, including inpatient and outpatient pharmacies, participated. Ten outpatient pharmacists were interviewed in the second phase.

Outcome measures: The pharmacists reported the frequency of PDMP use, opinion on the usefulness of PDMP, and action(s) taken after a concerning PDMP report.

Results: The usable response rate for pharmacists with a PDMP account was 17.6% (818/4659), and usable response rate for all pharmacists was 10.4% (967/9263). PDMP use varied by race, practice setting, and employer policy on PDMP use. Among the 818 PDMP users, 396 (48%) used the database at least once during a shift. Frequent PDMP users were more likely to recommend naloxone compared with less frequent users (adjusted odds ratio 1.70 [95% CI 1.09–2.65], $P = 0.02$). The following 3 interview themes were identified: time, company policy, and red flags.

Conclusion: PDMP has value to pharmacists of all practice settings studied. Frequent PDMP use may facilitate more pharmacist interventions, such as a naloxone prescription.

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Background

The United States is in the middle of a public health crisis of prescription opioid abuse, misuse, overdose, and death.^{1–3} More than 46 people in the United States die from prescription opioid overdose every day,^{4,5} a rate that has quadrupled since 2000.⁶ In parallel, per-capita rates of dispensing prescription opioids also tripled in the United States from 1999 to 2015.² The United States uses 80% of the worldwide opioid

supply and more than 99% of the worldwide hydrocodone supply.⁷ The combination of increased opioid use associated with opioid-related morbidity and mortality are key characteristics of the epidemic.

To combat this epidemic, 49 states (excluding Missouri), St. Louis County in Missouri, the District of Columbia, Guam, and Puerto Rico have implemented prescription drug monitoring programs (PDMPs), which are state-level databases containing records of dispensed controlled drugs and other drugs with abuse potential.⁸ The benefits of using PDMPs are widely acknowledged: PDMPs can help identify patients with concerning prescription use and assist in decision making related to dispensing and prescribing opioids⁹; have been effective in reducing “doctor-shopping”—the practice of visiting multiple prescribers to obtain multiple prescriptions typically for opioid misuse, abuse, or diversion^{10,11}; and can be used to analyze

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Key Points**Background:**

- Prescription drug monitoring programs (PDMPs) are state-level databases containing records of dispensed controlled drugs and other drugs with abuse potential.
- PDMPs can help identify patients with concerning prescription utilization and assist in decision making related to dispensing and prescribing opioids and naloxone.
- Only 20 states require pharmacists to query PDMP before dispensing an opioid; Washington State does not mandate dispenser queries of PDMP.

Findings:

- PDMP use varied by race, practice setting, and employer policy on PDMP use.
- Frequent PDMP users were more likely to recommend naloxone compared with less frequent users.

drug use and abuse trends. The data from PDMP queries help identify patients who might benefit from referral to drug abuse and misuse treatment as well as receiving naloxone. Mandatory-access policies, which raise PDMP utilization rates by requiring prescribers to query a drug history before prescribing a controlled substance, are associated with a reduction in opioid abuse, especially among young adults.¹²

Although an increasing number of states are mandating prescribers to query PDMP histories before prescribing opioids, only 20 states require pharmacists to query PDMP before dispensing an opioid. Washington State does not mandate dispenser queries but does mandate prescriber queries of PDMP.⁸ The Washington State PDMP is administered by the Department of Health and became operational on October 7, 2011.¹³ All schedule II to V (CII–CV) controlled substances dispensed or mailed to an address within the state are required to be electronically reported to Washington State PDMP within 1 business day.¹³ At the time of the study, Washington State PDMP did not interface with other states' PDMP databases.

Pharmacists are “gatekeepers” of controlled substances and have a corresponding responsibility to ensure each opioid prescription is issued for a legitimate medical purpose.¹⁴ PDMPs support pharmacists in fulfilling this corresponding responsibility by detecting high-risk opioid regimens and drug-seeking behavior¹⁵ and can support pharmacist decision making to prevent opioid diversion, reduce opioid abuse, and potentially save lives.^{10,12,16} However, despite the value and utility of PDMPs, pharmacist use is highly variable.^{17,18}

The PDMP may shed light on addiction, and pharmacists are positioned to refer patients for help. Washington is among a growing list of states that allow pharmacists with a collaborative practice agreement to prescribe naloxone, an opioid-reversal agent.¹⁹ Naloxone is safely and easily administered by patients, family members, caregivers, and bystanders in the event of an opioid overdose. Expanded access to this life-saving antidote by

health professionals, including pharmacists, is one of the U.S. Surgeon General's priorities in fighting the opioid epidemic.²⁰

Objectives

This study had 2 objectives: (1) to explore factors and situations that influence pharmacists to query a patient's controlled substance prescription history using the PDMP, and (2) to characterize actions taken by pharmacists (e.g., offer naloxone) following a concerning report from a PDMP query.

Methods*Study design*

The study population consisted of Washington State pharmacists licensed by the state as of September 1, 2018. The study design was an explanatory sequential 2-phase mixed-methods study beginning with a cross-sectional Web-based survey followed by key informant interviews.²¹ The study identified all Washington State pharmacists who had a valid e-mail on file with the Washington State Pharmacy Commission. To create a complete study population pool, public records requests for a list of licensed pharmacists, pharmacy permits, and the number of pharmacists with an active state PDMP registration in the state were made to Washington State. The pharmacist list included names, age, date of first licensure, sex, and e-mail address (if on file) but omitted practice location, PDMP account status, or specify employment type (e.g., inpatient). The pharmacist list included 10,571 state-licensed pharmacists, with only 9263 (87.6%) having an e-mail address on file as of August 31, 2018. Washington State Department of Health reported that 4659 pharmacists (44%) had registered to access the state PDMP as of September 1, 2018. PDMP users were the primary study population of interest to characterize the database's use and utility, whereas nonusers were analyzed to characterize factors of nonuse of PDMP. The list of pharmacy permits provided the pharmacy type (e.g., outpatient, inpatient) and address as of September 26, 2018. The pharmacy permit list allowed the dataset to be reviewed for representativeness. Respondents were excluded if they indicated via survey self-report that they did not practice in Washington State. Pharmacists were included if they reported either dispensing controlled substances or performing medication reconciliations, the latter to capture practicing pharmacists in a nondispensing role.

The development of an interview guide and selection of informants were completed after the analysis of the survey. Telephonic interviews were conducted with 10 purposefully selected pharmacists who responded to the initial survey as a PDMP user from an outpatient setting with differing company policies on accessing PDMP. Their interviews were used to help elucidate significant quantitative results from the study.

The University of Washington Institutional Review Board (IRB) deemed this study to be exempt from IRB review. This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Survey instrument

The survey questions were developed based on the literature, with input from the study authors and suggestions from

the Washington Department of Health (DOH) PDMP operations manager.^{18,22–27} The survey instrument was pretested with 8 pharmacists with different backgrounds and experience to ensure validity and clarity on questions, response choice, and length. On the basis of pilot feedback, the survey underwent minor modifications. The final instrument contained 71 items with branching logic; the possible number of questions ranged from 17 to 50 items for any respondent, depending on their self-reported use of the PDMP.

Because pharmacists practicing in inpatient settings use the PDMP differently compared with those practicing in outpatient settings, the option “not applicable” was added to several questions to ensure respondents could easily navigate the survey. Pharmacists from all practice settings were asked how often they used the PDMP in different case scenarios and their opinion of PDMP’s usefulness in different situations using a 5-point Likert item scale (e.g., 1 = never to 5 = always, 1 = strongly disagree to 5 = strongly agree). Another series of questions asked pharmacists what actions they would take after receiving a report from a PDMP query in 2 different situations—one suggesting potential diversion or misuse and another revealing dangerous combinations of medications—both of which would concern a reasonable pharmacist. Respondents in these scenarios could select all that apply from a list of options developed from previous literature.²² Pharmacists who reported they did not use or underused the PDMP were asked to rank their top 3 reasons for nonuse or underuse from a list developed by the authors with input from Washington’s DOH PDMP operations manager. Underuse was defined as accessing PDMP less than once a shift. The survey instrument is in [Appendix 1](#), available on japha.org as supplemental content.

The survey also collected demographic information (e.g., age, sex, race, time since first licensed by WA, location, and practice setting) to aid in explorations, stratification of analyzed data, and identification of possible subjects for recruitment for interviews.

Recruitment of interview participants

The demographic survey information enabled purposeful selection for interview. Specifically, respondents identified as PDMP users from different outpatient practice settings and differing company policies governing PDMP use were recruited to elucidate significant quantitative results using semistructured interviews. Respondents eligible for interview recruitment included those who indicated willingness to participate in a follow-up interview and provided their telephone number (23% of all respondents). A total of 10 pharmacists meeting the interview criteria were recruited. All interview respondents were entered into a draw for a single \$50 cash card as an incentive. Informant demographics may be found in [Appendix 2](#).

Survey

Study data were collected and managed using Research Electronic Data Capture (REDCap) tools hosted at the University of Washington, Seattle, WA.²⁸ REDCap is a secure, Web-based application designed to support data capture for research studies. The survey instrument was loaded into REDCap, and an invitation was distributed via e-mail to all 9263 Washington State pharmacists with an e-mail address in

September 2018. Two reminder e-mails were sent 1 week apart only to nonrespondents. The survey closed 4 weeks after the initial e-mail. A draw for 1 of 2 \$50 cash cards was used as an incentive to improve responses.

Interview

A semistructured interview guide was developed based on similar guides in the literature.^{29,30} Topics in the interview guide were limited in scope to serve as follow-up items from survey results to triangulate the interpretation of statistically significant quantitative findings. Topics included were as follows: (1) situations where the pharmacist most often used the PDMP; (2) how PDMP influenced filling prescriptions; (3) how PDMP reports are communicated to patients and prescribers; and (4) pharmacist practice concerning naloxone recommendations. All interviews were digitally audio-recorded and transcribed using an independent transcription service. The interview guide is provided in [Appendix 3](#). Interviews were conducted by telephone in February 2019 by RP as the sole interviewer. At the beginning of the interview, RP identified himself as a pharmacist practicing in Washington State. Each interview ranged from 12 to 25 minutes in duration.

Data analysis

Descriptive statistics were performed when appropriate to describe the survey sample and survey responses. Bivariate statistics using logistic regression and the likelihood ratio test (Rao-Scott) were used to identify factors that influence PDMP use. All statistics were determined using survey weights.³¹ Survey weights were calculated through calibration of survey responses by raking the data using known population parameters (number with PDMP account registration, sex, age, time since first licensed, and location) obtained from public records. Missing data were reviewed for patterns. Variables with missing data were determined to be most likely missing at random, except for the outpatient case scenario questions that pharmacists from an inpatient setting skipped. Inpatient pharmacists were excluded from outpatient case questions in the data raking and analysis. However, inpatient pharmacists were included in the remainder of the data raking and analysis. Multiple imputation using predictive mean matching and survey weighting were used to address missing data.³²

Multivariable logistic regression was used to analyze factors influencing naloxone recommendations by pharmacists. Logistic regression was used to calculate odds ratios (ORs) with 95% CIs. Statistical analysis was performed using R statistical software (version 3.5.2), the *mice* package (version 3.3.0) for multiple imputation, and the *survey* package (version 3.34) for data raking and logistic regression.^{33–35} Differences were considered significant at $P < 0.05$ set a priori.

Results

Demographics

Out of the 10,571 licensed pharmacists (as of August 31, 2018), only 9263 (88%) had a valid e-mail on file. The response rate was 17.6% among pharmacists with a registered PDMP account and 12% among all pharmacists invited to participate.

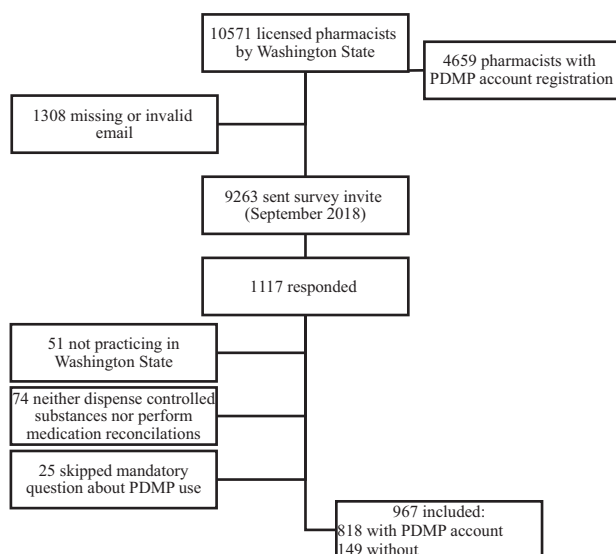


Figure 1. Survey sample response rate and exclusion criteria. PDMP, prescription drug monitoring program.

The final usable response rate for PDMP users and nonusers was 10.4% after excluding ineligible respondents. Figure 1 describes the characteristics of respondents who were excluded. Respondent demographics are compared with known population demographics in Table 1.

Respondents were mainly PDMP account holders (84.6%), Caucasian (56%), and primarily from an outpatient setting (72%). The distribution of sex, age, years since first licensed, and practice location were representative to known population numbers, available through public records.

Pharmacists' use of PDMP

All pharmacists were asked about their use of PDMP and reasons for nonuse or underuse if average utilization was reported as less than once a shift. A total of 15% ($n = 149$) of eligible respondents reported not using the PDMP in the last year. The top reasons reported for nonuse were as follows: not relevant to practice (52%, 78/149), insufficient time (24%, 36/149), and not knowing how to use PDMP (21%, 32/149). Top reasons for underuse were as follows: not relevant to practice (58%, 298/515), insufficient time (50%, 256/515), lack of reimbursement for additional time to use PDMP (13%, 65/515), and not believing that PDMP would make a difference (10%, 52/515).

Among PDMP users, 396 (48%) reported using the database at least once a shift. Pharmacists who worked in a chain pharmacy used the PDMP more often than any other setting. Respondents were significantly less likely to use PDMP at least once a shift in the absence of a company policy governing PDMP use compared with those whose employer had a policy (adjusted OR 0.13 [95% CI 0.10–0.19], $P < 0.001$). Only 18% of respondents working at an independent pharmacy reported an employer policy regarding PDMP use compared with 52% of outpatient chain pharmacies. A detailed comparison of factors influencing PDMP use is presented in Appendix 4.

Pharmacists practicing in outpatient settings were asked how their use of PDMP varied by different circumstances commonly encountered in an outpatient practice surrounding

the prescription itself, patient characteristics, or prescriber type. A cash-paying patient was the top scenario for checking the PDMP often to always (85%). In contrast, only 44% of pharmacists would check the PDMP often to always for an established patient. The prescriber type had only minor differences for checking PDMP between specialties, with 56% checking often to always if the prescriber practiced at an emergency room or urgent care setting compared with 45% for pain specialists or primary care providers. A complete breakdown of use by each case from pharmacists in an outpatient setting is shown in Figure 2.

Pharmacists' opinion toward the usefulness of PDMP

All pharmacists who have used the PDMP in the last year were asked how useful the database was in different health care situations. Most pharmacists felt PDMP was either moderately or extremely helpful in identifying doctor and pharmacy “shoppers” (97%), misuse or abuse of opioids (91%), and those at high risk for opioid-related overdose (78%). Furthermore, most pharmacists believed the database was moderately to extremely useful to help decide whether to dispense (or fulfill) a controlled substance prescription (or order) (90%). In contrast, only 50% responded that the database was either moderately or extremely useful in helping to manage patients' pain.

Pharmacists' actions after use of the PDMP report

Respondents who used PDMP in the last year were asked what action(s) they would usually take if they discovered a concerning finding from a database query. The first scenario posed in the survey was a report that suggested potential diversion or misuse, and the second scenario was a report that suggested dangerous combinations of medications. Respondents could select all that apply, and most answered by calling the prescriber (84% and 83% for scenarios 1 and 2, respectively), followed by discussing the concern with the patient (48% and 58%, respectively).

A minority of respondents indicated that they would recommend or, under a collaborative practice agreement, prescribe naloxone in response to scenarios 1 and 2 (14% and 17%, respectively). A complete description of pharmacist responses for both scenarios is shown in Table 2. Frequent PDMP users (those who checked PDMP at least once a shift) were more likely to recommend naloxone compared with less frequent users in a multivariable model (frequent 30% [119 of 396] vs. less frequent 12% [49 of 422]; adjusted OR 1.70 [1.09–2.65], $P = 0.02$; see Table 3). Other interventions (discuss with the patient, refusing to fill, recommend an alternative) were significant in bivariate analysis but not significant in a multivariable analysis after adjusting for practice setting, company policy, race, and years since first licensed.

Explanatory follow-up

Interview theme: Time

What barriers affect your ability to check PDMP?

When I work there are no other pharmacists working. I don't have enough time.

—[pharmacist 4]

Table 1
Responder demographics

Variable	Sample (n = 967)	Population (N = 10,571) ^a
	Frequency n (%)	Population N (%)
PDMP use in last 12 months ^b		
Yes	818 (84.6)	4659 (44.1)
No	149 (15.4)	5912 (55.9)
Age (y), mean (SD)	42.4 (11.9)	45.4 (12.4)
Age category (y)		
< 30	110 (11.4)	812 (7.7)
30–39	296 (30.6)	3243 (30.6)
40–49	199 (20.6)	2842 (26.9)
50–59	131 (13.5)	1942 (18.4)
≥ 60	102 (10.5)	1732 (16.4)
Missing	129 (13.3)	—
Sex		
Male	289 (29.9)	4310 (40.8)
Female	567 (58.6)	6261 (59.2)
Missing	111 (11.5)	—
Years since first licensed in WA		
5 years or less	303 (31.3)	2982 (28.2)
6–10 years	160 (16.5)	1827 (17.3)
11–19 years	178 (18.4)	2451 (23.2)
20–29 years	142 (14.7)	1752 (16.6)
30+ years	102 (10.5)	1559 (14.7)
Missing	82 (8.5)	—
Practice location, Medicaid region ^c		
North Sound	131 (13.5)	(15.4)
King County	296 (30.6)	(30.0)
North West	34 (3.5)	(4.9)
West	47 (4.9)	(8.6)
Pierce County	79 (8.2)	(10.9)
North Central	27 (2.8)	(4.3)
North East	93 (9.6)	(10.0)
Greater Columbia	82 (8.5)	(10.4)
South West	80 (8.3)	(5.5)
Missing	98 (10.1)	—
Race		
Asian	206 (21.3)	
Caucasian	542 (56.0)	
African American	12 (1.2)	
Other ^d	41 (4.2)	
Missing	166 (17.2)	
Practice setting		
Outpatient: chain	364 (37.6)	
Outpatient: independent	92 (9.5)	
Outpatient: clinic/hospital	182 (18.8)	
Inpatient	160 (16.5)	
Other	90 (9.3)	
Missing	79 (8.2)	

Abbreviation used: PDMP, prescription drug monitoring program; WA, Washington.

^a 10,571 Washington State–licensed pharmacists in active status as of August 31, 2018.^b Population number represents number of PDMP account registrations by pharmacists as of September 1, 2018.^c Washington State Medicaid regions key: <https://www.hca.wa.gov/assets/program/ach-map.pdf>.^d Multiple race grouped together for statistical purposes. “Other” represents: Hispanic, Latinx, Native American, Pacific Islander, and other not listed.*It takes additional time to log into the PDMP and check it.*

—[pharmacist 5]

I think the way retail is going, if they pile more and more on us, it makes it hard. I don't check the PDMP every time, and part of that is a time constraint.

—[pharmacist 3]

*Interview theme: Company policy**What policies, if any, does your employer have regarding checking the PDMP?**[Outpatient chain] has a specific policy that they want you checking [the PDMP] on patients that you're not familiar with or patients that have never come into the pharmacy before.*

—[pharmacist 2]

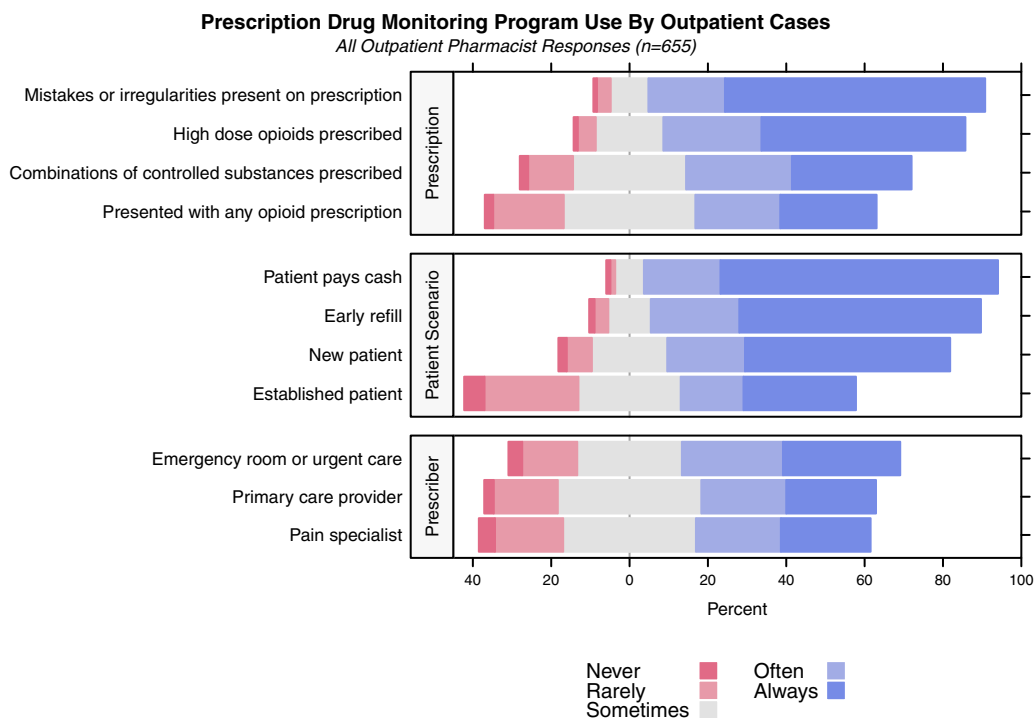


Figure 2. Prescription drug monitoring program use by outpatient cases. All outpatient pharmacist responses (n = 655).

It's [checking PDMP] not mandated, but every pharmacist needs access. My employer makes sure, and as a manager, I'm supposed to make sure all my staff pharmacists have access and that they know how to get on there and that they can get on there. Whether or not they always utilize it, that's up to them. But they [employer] provide access for us and encourage us to go on there.

—[pharmacist 3]

[Outpatient chain] made sure that everyone is aware of our corresponding responsibility and there was even training for employees where we had to go in and acknowledge that we have an account and had access to the PDMP website and knew how to use it.

—[pharmacist 7]

We don't have any policies with accessing the PDMP. I use it on a case by case basis to access PDMP. I don't access it for every prescription.

—[pharmacist 5]

I check everybody, not just people who set off alarms because it's mandatory where I work.

—[pharmacist 1]

On discussing naloxone

My employer has been so great and proactive about setting guidelines when we're to offer it [naloxone] and making these guidelines real clear to us pharmacists if the prescription is over a certain morphine milligram equivalent amount or to anyone who is on [buprenorphine and naloxone] for treatment of opioid dependence.

—[pharmacist 1]

Interview theme: Red flags

What prompts you to check PDMP?

I'm checking the PDMP for people I don't know.

—[pharmacist 2]

When I have a patient coming in that I don't recognize or that I can tell they have not filled here before I will check the PDMP. Especially if they prefer to pay cash and they claim they don't have insurance I will check it.

—[pharmacist 3]

If it's from a prescriber that's far away or if the prescription appears altered in one way or another it will tip me off to check it. Anytime I get a new high dose opioid, I'll check it.

—[pharmacist 4]

If they pay out of pocket for it or if it's a refill too soon.

—[pharmacist 5]

Their morphine dose is outside the acceptable, what's considered acceptable limits or going to more than one pharmacy. That's the big alarm bell right there.

—[pharmacist 6]

I usually use it whenever it's a new patient presenting a controlled substance or an existing patient but their first time presenting a controlled substance. I'll usually check to make sure that they haven't filled a controlled substance recently in another chain.

—[pharmacist 7]

Table 2

Pharmacist response to concerning PDMP report scenarios (N = 818)

Response	Scenario 1	After a PDMP query, if the report suggests potential diversion or misuse, I usually...				
	Scenario 2	After a PDMP query, if the report suggests dangerous combinations of medications, I usually...				
	Discuss the concern with the patient	Call the prescriber	Recommend a noncontrolled alternative drug	Refuse to fill the prescription or order	Recommend or prescribe naloxone	Other action not listed here
Response to scenario 1	395 (48)	686 (84)	119 (15)	321 (39)	113 (14)	43 (5)
Response to scenario 2	476 (58)	677 (83)	154 (19)	161 (20)	141 (17)	33 (4)

Values are n (%) and use unadjusted data.

Response: Select all that apply; many respondents chose more than 1 option.

Abbreviation used: PDMP, prescription drug monitoring program.

Discussion

Pharmacists are vital members of a patient's health care team and are well positioned to prevent and reduce the abuse and misuse of opioids. The oath of a pharmacist includes considering "...the welfare of humanity and relief of suffering my primary concerns."³⁶ Pharmacists should uphold this oath in practice by employing their unique knowledge in the delivery of services to help ensure optimal outcomes for their patients. When reviewing medication orders and prescriptions to manage their patients' pain, pharmacists commonly perform a retrospective and concurrent drug utilization review, which could include a query of the PDMP database. A PDMP report includes past controlled substance prescription fill history, including the medication name, formulation, quantity, day supply, dispensing pharmacy's name and address, and prescriber's name and address for each patient. This information may help the pharmacist determine the accuracy and appropriateness of a medication order and further aid in screening for potential drug-drug interactions, duplications in therapy, or the potential for inappropriate use.

PDMP has given the pharmacists an objective tool to help base decisions on filling a prescription. Although insurance companies also inform pharmacists on the next available fill dates for prescription claims, the PDMP report covers uninsured patients and provides more detailed information on past dosing, prescriber, and other combination(s) of medications, if any.

This study found a difference in PDMP use by pharmacists from different practice settings. This is partially explained by the database's likely usefulness for different settings. For example, the PDMP may help in transitions of care where an inpatient pharmacist may look to identify which pharmacy or pharmacies the patient uses to obtain a complete medication list or to confirm opioid tolerance for an inpatient opioid order. A clinic-based pharmacist may determine compliance with a

pain contract or similarly obtain a current history as part of pain management. An outpatient community pharmacist could query a PDMP history after receiving an opioid prescription as part of their corresponding responsibility to determine appropriateness. Among outpatient pharmacists, checking PDMP was often prompted by "red flags" or different business practices.

Pharmacists from Washington State do not have a requirement of checking PDMP before dispensing an opioid to the patient. In every practice setting, employers who had a policy on checking PDMP demonstrated more frequent use of PDMP than those whose employer lacked such as policy. State laws that require prescribers to check the PDMP led to reduced opioid abuse.¹² Future studies should assess if opioid abuse is affected by mandating the use of PDMP before dispensing an opioid. Integration of pharmacy software with a health information exchange portal containing multistate PDMP databases could overcome the time burden of querying a patient record.

New opioid guidelines, state laws, and company policies guide health care providers in offering naloxone to patients.^{9,37} The present study showed that pharmacists who frequently use the PDMP were more likely to recommend or prescribe naloxone than those who use it less often, after adjusting for practice setting, years since first licensed, race, and if the employer had a company policy on PDMP use. However, a minority of surveyed pharmacists responded that they would furnish naloxone following a concerning PDMP report. Puzantian et al.³⁸ reported that only 23.5% of California community pharmacies offered naloxone 2 years after implementation of a standing order. Similarly, Meyerson et al.³⁹ reported that only 23.6% of Indiana community pharmacies dispensing naloxone 1 year after implementation of a similar standing order.

A previous study showed those who use the PDMP were more likely to refuse to dispense a prescription than those who did not; however, the present study failed to find a difference

Table 3Logistic regression on pharmacist actions from Table 2 with frequent PDMP use^a as dependent variable (N = 818)

Variable N (row %)	Bivariate analysis		Multivariable analysis ^b	
	Weighted OR ^c [95% CI]	P value	Weighted OR ^c [95% CI]	P value
Naloxone recommendation	3.23 [2.27–4.58]	< 0.001	1.70 [1.09–2.65]	0.02
Discuss concern with patient	1.70 [1.29–2.24]	< 0.001	1.23 [0.87–1.74]	0.24
Recommend an alternative noncontrolled drug	1.49 [1.09–2.04]	0.01	1.46 [0.96–2.24]	0.08
Refuse to fill the prescription/order	1.94 [1.48–2.54]	< 0.001	1.27 [0.92–1.77]	0.15
Call the prescriber	0.82 [0.56–1.22]	0.34	0.54 [0.31–0.94]	0.03

Abbreviations used: PDMP, prescription drug monitoring program; OR, odds ratio.

^a Frequent use in the last month; checking at least once a shift.^b Model adjusted for years since first licensed, race, practice setting, and company policy on PDMP use.^c Survey weights; OR for performing the action.

in the multivariable analysis.⁴⁰ Naloxone use was the only significant intervention between frequent and infrequent PDMP users in multivariable analysis, suggesting that the PDMP report may aid the pharmacist in every practice setting to recommend or prescribe naloxone by identifying those who may be at the most significant risk for overdose.

Limitations

The main limitation of the study was the low response rate, especially from non-PDMP users. Nonusers of PDMP accounted for 15.4% of the usable survey sample, yet 55.9% of pharmacists did not have a PDMP account at the time of the study. Such a low response from nonusers may not sufficiently explain all variables for nonuse of PDMP. Statistical analysis attempted to correct for low response of nonusers through the inclusion of survey weights calibrated from the known population numbers as previously described. The sampling strategy (convenience sample) is another limitation of the study. Although data raking attempted to correct for limitations of the response rate and representativeness, there may still be limits that a convenience sample cannot overcome. Washington State is 1 of the 30 states that do not require the pharmacist to query a patient history from the PDMP database before dispensing an opioid. These results may be less generalizable to states with such requirements. Another limitation is that the study did not verify the presence or absence of employer policies on PDMP use or actual dispensing of naloxone.

Conclusion

PDMP is reported to be valuable to pharmacists from all practice settings, even though use varies in each setting. Frequent PDMP use may facilitate more pharmacist interventions, such as a naloxone prescription.

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Supplementary Data

Supplementary data related to this article can be found at <https://doi.org/10.1016/j.japh.2019.09.016>.

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