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Epidemiology

Concern about the Expanding Prescription Drug Epidemic: A Survey of Licensed Prescribers and Dispensers

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Background: Prescription drug misuse and abuse has reached epidemic levels in the U.S., and stands as a leading cause of death. As the primary gatekeepers to the medications contributing to this epidemic, it is critical to understand the views of licensed health care professionals.

Objective: In this study, we examine health care professionals' concern regarding prescription drug abuse in their communities and the impact their concern has had on their prescribing and dispensing practices.

Study Design: An online survey of licensed health care providers.

Setting: Conducted in Indiana.

Methods: This study was a state-wide evaluation of Indiana's prescription drug monitoring program. The questionnaire asked respondents how concerned they were about prescription drug abuse in their community. Variation in the level of concern was examined using ordinary least squares regression and information about the respondents' demographic background and clinical experience. In addition, we used logistic regression to examine whether concern was associated with changing prescribing and/or dispensing behavior.

Results: The majority of providers indicated they were "moderately" or "extremely concerned" about prescription drug abuse in their communities. The level of concern, however, varied significantly by profession, with pharmacists, physicians, nurse practitioners/physician assistants being more concerned than dentists. Additional analyses indicate that providers with higher levels of concern were those who also reported recently changing their prescribing and/or dispensing behavior.

Limitations: The voluntary nature and geographical focus of the study limits the generalizability of the findings.

Conclusion: Concern about prescription drug abuse is generally high across the major health care professions; however, a significant minority of providers, particularly among dentists, expressed little or no concern about the epidemic. Increasing health care providers' general level of concern about prescription drug abuse may be an effective public health tool for encouraging voluntary reductions in prescribing and/or dispensing controlled substances.

Key words: Attitudes of physicians, nurse practitioners, physician assistants, and dentists; prescription drug misuse and abuse; prescribing practices; dispensing practices

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The misuse and abuse of prescription drugs continue to expand in the U.S. (1-3). Over the past 2 decades, prescription drug misuse and abuse emerged as a leading cause of injury-related deaths in the U.S. (4-7). Addictive medications, including opioids, central nervous system (CNS) depressants, and stimulants are the most frequently prescribed and abused drugs (8,9). The most significant impact and increase in opioid and stimulant abuse have occurred among teenagers and young adults (10,11), while CNS depressants are abused more frequently by older adults and are a contributing factor in the majority of fall-related injuries and deaths (12,13). In terms of who is at inflated risk, non-Hispanic whites, males, and rural residents are more likely to abuse prescription drugs (14-16). The cost of opioid abuse in the U.S. reached nearly $56 billion in 2007 and has likely continued to increase alongside the increase in distribution and abuse of prescription drugs (17).

To combat the expanding epidemic, public health policymakers and researchers are exploring a variety of intervention strategies. These strategies consider how to reduce the demand for prescription drugs and to contract the supply of scheduled narcotics available in communities. While public concern and awareness of the negative consequences related to prescription drug misuse and abuse has grown in recent years (18), surprisingly little is known about health care providers' attitudes regarding prescription drug abuse in their communities, or how their views influence efforts to address the epidemic. This paper summarizes data from a large survey of health care providers to fill gaps in our knowledge and improve our understanding of the policy landscape surrounding this critical public health problem.

Background

Recent research has documented that growing rates of prescription drug misuse and abuse are strongly related to the dramatic increase in accessibility and prescribing of prescription drugs (19-21). As such, research and policy efforts focus heavily on understanding health care providers' prescribing behavior and identifying strategies to encourage providers to reduce their reliance on prescription drugs, particularly opioids. Early on, computerized Physician Order Entry (CPOE) systems were put in place to avoid adverse events by facilitating tracking of medications, supervising drug interactions, and reviewing laboratory reports (22,23). Electronic health record (EHR) systems represent similar, but more technologically comprehensive approaches to assist providers and health care systems in tracking patients' prescriptions as well as their clinical visits, medical conditions, and other associated medical history to avoid prescribing deadly combinations of drugs and to enhance patient safety and the quality of health care (24,25). Programs, such as PharmaNet, were developed to integrate multiple providers and health systems to reduce the improper prescribing of opioids and benzodiazepines (CNS depressant) by centralizing all prescriptions in one networked information system that contains live, updated data on patients' medications (26).

State policymakers also have launched prescription drug monitoring programs (PDMPs) to document and monitor the use of Schedule II – V narcotics (1,7,27). The long-term goal of these programs is to reduce prescription drug abuse and identify instances of potential abuse (1). Data from PDMPs have been used primarily to monitor the dispensing of opioids, CNS depressants, and stimulants (27); document prescribing patterns (28); and identify potential cases of "doctor shopping" as well as problematic prescribing as part of law enforcement investigations (29). Studies of the effectiveness of PDMPs in reducing prescription drug abuse and improper prescribing are mixed (1,27,29); however, many of these systems are still relatively new and in development.

While there have been significant policy changes in recent years pertaining to the oversight and regulation of prescribing practices, there has been little systematic research on prescribers' and dispensers' attitudes regarding community prescription drug misuse and abuse. Prior studies have documented that health care providers hold generally positive attitudes about the clinical acceptability and utility of pain medication. One survey, for example, found that approximately two-thirds of prescribers had generally favorable attitudes about prescribing long-acting opioids to non-terminal pain patients because they believed that these medications can improve patients' overall quality of life (30). Support, however, varies depending on the providers' clinical role and specialty, with pharmacists and advanced practice nurses expressing more concern about the potential of overprescribing pain medication (31).

Unfortunately, little is known about health care providers' views of the prescription drug abuse epidemic, and how their views are reflected in their practices. In order to improve scientific understanding of the policy landscape surrounding public health efforts to address the epidemic, we utilized data from a large

survey of different types of licensed health care providers to document their general level of concern regarding prescription drug abuse in their communities. The survey asked whether these attitudes are influential in individual providers' self-reported changes in their prescribing and/or dispensing practices.

Methods

This study is based on a voluntary, online survey of licensed health care providers conducted in 2013 in Indiana as part of a state-wide evaluation of the state's prescription drug monitoring program. The survey tool asked respondents how concerned they are about the prescription drug epidemic. Variation in the level of concern is examined using ordinary least squares (OLS) regression and information about the respondents' demographic background as well as their clinical practice and experience.

The survey instrument was developed by the first and third author collaboratively with Indiana Professional Licensing Agency (IPLA) staff and key leaders of Indiana's state-wide Prescription Drug Abuse Prevention Taskforce. Invitations to participate were distributed electronically by the IPLA to all 38,333 health care providers licensed to practice in Indiana in 2013. In addition to questions regarding the respondents' demographic background and characteristics of their clinical practice, providers were asked: "How concerned are you about prescription drug abuse in your community?" Responses included "extremely concerned," "moderately concerned," "slightly concerned," and "not concerned at all." In the multivariate analyses, responses were coded so that higher values indicated higher levels of concern. Respondents also were asked whether they prescribed (only physicians, NPs/PAs, and dentists) or dispensed controlled substances in the past 12 months and, if so, whether they had changed their prescribing/dispensing practices in the past year. If they had made changes, they were asked to indicate whether they were prescribing and/or dispensing "far more," "more," "fewer," or "far fewer" controlled substances. For this analysis, we collapsed those who indicated prescribing or dispensing fewer or far fewer (coded 1) and compared them with those who reported no changes or who increased their prescribing or dispensing of controlled substances (coded 0).

The focal independent variables were constructed based on responses to the questions regarding the respondents' demographic background and clinical work experience. Specifically, we included the following demographic measures: gender (0 = men; 1 = women), age (in years, estimated based on the self-reported birth year); and race/ethnicity (0 = white; 1 = non-white). In terms of clinical background, we constructed indicators of the respondents' primary practice setting (coded as a series of dummies indicating whether the respondent worked in an outpatient, inpatient, emergency room/urgent care, or other setting [the reference category]); years in practice; whether they practiced in a rural or urban area (based on U.S. Census Bureau scale that classifies Indiana counties from 1 = most urban to 8 = most rural); and, the percentage of patients in the respondents' practice they believe abuse prescription drugs. Additionally, to control more objectively for community prescription drug abuse burden, we included the per capita rate of scheduled prescriptions dispensed in the county where the respondent practiced, using data from Indiana's prescription drug monitoring program (32). Table 1 provides the frequency distributions for the independent variables.

IBM SPSS version 21.0 was used to prepare the data and complete all analyses. In addition to applying frequencies and cross-tabs to evaluate our basic research questions, we used multivariate OLS regression techniques to detect differences in the overall level of concern based on their demographic and clinical background. Logistic regression methods were used to examine the importance of concern on respondent-reported recent changes in prescribing/dispensing practices while controlling for the focal background characteristics. Because age and years in clinical practice were highly correlated, only age was included in the multivariate analyses to avoid concerns with multicollinearity. The rate of missing data was relatively low on the independent variables (< 3 – 6%); as such, we substituted the mean (or referent value for dummy variables) when respondents did not provide valid responses. However, respondents who did not answer the focal dependent questions regarding concern and/or prescribing practices were dropped from the analysis, thus 248 respondents were not included in our regression analysis.

Results

A total of 5,994 usable surveys were completed for a response rate of 15.6%. The present analysis focuses on the 5,846 licensed health care professionals holding licenses in 4 major provider groups: physicians (MDs and DOs; N = 2,444), mid-level providers (i.e., nurse practitioners and physician assistants or NPs/PAs; N = 1,067), dentists (N = 753), and pharmacists (N = 1,582) (Table 1). The discrepancy between total survey respon-

Table 1. *Demographic, practice setting, and clinical experience of licensed prescribers and dispensers by provider type and for the total sample (N = 5,846).*

	Physicians (MDs, DOs, and DPMs) (N = 2,444)		Nurse Practitioners (NPs) and Physician Assistants (PAs) (N = 1,067)		Dentists (N = 753)		Pharmacists (N = 1,582)		Total Sample (N = 5,846)	
Characteristic	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Gender (X^2 = 1,270.8, P < .001)										
Women	683	28.8	919	88.9	155	21.4	833	54.4	2,590	45.7
Age (X^2 = 279.9, P < .001)										
35 or younger	241	10.3	174	17.0	81	11.2	401	26.4	897	16.0
36-45	464	19.9	269	26.2	123	17.0	315	20.7	1,171	20.9
45-55	606	25.9	304	29.7	192	26.6	328	21.6	1,430	25.5
56 or older	1,026	43.9	278	27.1	327	45.2	475	31.3	2,106	37.6
Race/Ethnicity (X^2 = 180.4, P < .001)										
Asian	205	8.7	6	0.6	18	2.5	48	3.2	277	4.9
Black/African American	73	3.1	19	1.8	11	1.5	28	1.8	131	2.3
Latino	33	1.4	14	1.3	8	1.1	9	0.6	64	1.1
White	1,940	82.6	981	94.4	667	92.3	1,404	92.2	4,992	88.6
Other Race	99	4.2	19	1.8	19	2.6	34	2.2	171	3.0
Primary Practice Setting (X^2 = 2,150.3, P < .001)										
Outpatient	1,323	54.1	636	59.6	510	67.7	139	8.8	2,608	44.6
Inpatient	460	18.8	155	14.5	0	0.0	349	22.1	964	16.5
ER/Urgent Care	316	12.9	130	12.2	2	0.3	4	0.4	452	7.7
Other	345	14.1	146	13.7	241	32.0	1,090	68.9	1,822	32.2
Years in Practice (X^2= 827.0, P < .001)										
Less than 5 years	299	12.2	354	33.2	53	7.0	234	15.3	940	16.4
5-9 years	286	11.7	216	20.2	67	8.9	200	13.1	769	13.4
10-14 years	286	11.7	220	20.6	59	7.8	140	9.2	705	12.3
15-19 years	326	13.3	164	15.4	76	10.1	151	9.9	657	11.5
20-24 years	341	14	53	5.0	95	12.6	170	11.1	659	11.5
25 or more years	906	37.1	60	5.6	403	53.5	630	41.3	1,999	34.9
Primary Practice Location (X^2 = 52.2, P < .001)										
Metro Area: 1 Million or More People	1,140	46.6	512	48.0	347	46.1	745	53.0	2,744	51.0
Metro Area: 250,000 to 1 Million People	597	24.4	191	17.9	153	20.3	193	13.7	846	15.7
Metro Area: Fewer than 250,000 People	368	15.1	203	19.0	115	15.3	229	16.3	915	17.0
Non-metro/Adjacent to Metro: 20,000 or More People	65	2.7	51	4.8	24	3.2	54	3.8	194	3.6
Non-metro/Not Adjacent to Metro: 20,000 or More People	63	2.6	19	1.8	13	1.7	39	2.8	134	2.5
Non-metro/Adjacent to Metro: Less than 20,000 People	180	7.4	78	7.3	86	11.4	127	9.0	471	8.8
Non-metro/Not Adjacent to Metro: Less than 20,000 People	31	1.3	13	1.2	15	2.0	19	1.4	78	1.4

Table 1 (cont.). *Demographic, practice setting, and clinical experience of licensed prescribers and dispensers by provider type and for the total sample (N = 5,846).*

	Physicians (MDs, DOs, and DPMs) (N = 2,444)		Nurse Practitioners (NPs) and Physician Assistants (PAs) (N = 1,067)		Dentists (N = 753)		Pharmacists (N = 1,582)		Total Sample (N = 5,846)	
Characteristic	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Estimated Percent of Own Patients Who Misuse/Abuse Prescription Drugs (X^2 = 613.33, P < .001)										
0%	285	12.2	81	7.8	99	13.5	75	4.9	540	9.6
1-10%	1,119	47.9	499	48.0	478	65.0	400	26.2	2,496	44.3
11-20%	385	16.5	149	14.3	80	10.9	318	20.8	932	16.5
21-30%	238	10.2	128	12.3	41	5.6	252	16.5	659	11.7
31-50%	196	8.4	101	9.7	26	3.5	269	17.6	592	10.5
51% or more	114	4.9	82	7.9	11	1.5	212	13.9	419	7.4
Per Capita County Rate of Scheduled Prescriptions Dispensed (X^2 = 26.8, P < .002)										
Less than 1.00	216	8.8	140	13.4	84	11.7	114	8.1	554	10.3
1.00-1.49	1,480	66.8	680	65.3	469	65.1	981	69.8	3,610	67.1
1.50-1.99	355	16.0	158	15.2	126	17.5	227	16.1	866	16.1
2.00 or higher	164	7.4	63	6.1	41	5.7	84	6.0	352	6.5

Table 2. *Community concern regarding prescription drug abuse by provider type and for the total sample (N = 5,598).*

	Physicians (MDs, DOs, and DPMs) (N = 2,375)		Nurse Practitioners (NPs) and Physician Assistants (PAs) (N = 1,041)		Dentists (N = 740)		Pharmacists (N = 1,542)		Total Sample (N = 5,598)	
	N	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Not Concerned At All	44	1.8	17	1.6	14	1.9	16	1.0	91	1.6
Slightly Concerned	353	14.4	143	13.4	188	25.0	146	9.5	722	12.7
Moderately Concerned	945	38.7	425	39.8	321	42.6	586	38.0	2,277	40.0
Extremely Concerned	1,102	45.1	482	45.2	230	30.5	794	51.5	2,608	45.8

dents and the present study's sample is accounted for by 148 participants who did not provide their professional licensure; we dropped these individuals from the analysis. Of the respondents included, the majority identified as white (88.6%) and with slightly more men (54.3%) than women (45.7%). The mean age was just over 50 (50.3), with a mean of almost 19 years (18.8) of medical practice. Over half of the respondents (53.9%) felt that 0 to 10% of their patients misused or abused prescription medications. Given the response rate and questions about the generalizability of our sample, we compared the present sample to a survey of licensed providers at the time of licensure renewal/new application (N = 40,006; see Appendix I). Difference of proportion and mean tests resulted in significant differences across all comparisons, except the gender distribution among dentists.

Table 2 describes the overall level of concern for our 4 provider groups and the full sample. The majority (85.8%) indicated that they were either "extremely" or "moderately" concerned about prescription drug abuse in their communities. However, there were significant differences across the health care provider categories, with pharmacists being the most concerned (89.5%), followed by NPs/PAs (85.0%), and physicians (83.8%). While a majority of dentists were concerned (73.1% indicated extremely or moderately so), a significantly larger minority of dentists stated they were only "slightly concerned" or "not concerned at all" (26.9%), compared with the other 3 provider groups.

The OLS multivariate analyses, reported in Table 3, indicated further that the providers most likely to be more concerned were those who are women (b = .051), older (b = .006), and white

Table 3. *OLS regression analysis of prescribers/dispensers' concern about community prescription drug abuse with provider demographic, clinical, and practice characteristics (N = 5,846).*

	b	SE	T
Constant	2.326	.065	35.872***
Gender (Female)	.051	.021	2.396*
Age	.006	.001	7.488***
Race (Nonwhite)	-.091	.029	-3.078**
Provider Type (Physician)			
Nurse Practitioner (NP)/Physician Assistant (PA)	-.033	.028	-1.149
Dentist	-.202	.030	-6.740***
Pharmacist	-.019	.028	-.673
Primary Practice Setting (Other)			
Outpatient	.030	.025	1.188
Hospital	-.038	.029	-1.296
Emergency Room	.003	.041	.803
Primary Practice Location (Rural-Urban)	.013	.006	2.161*
Perceived Patient Misuse/Abuse of Prescription Drugs	.167	.007	23.610***
Per Capita County Rate of Scheduled Prescriptions Dispensed	.081	.014	5.897***
F	68.930***		
S.E.E.	.691		
R2	.124		

* = < .05, ** = < .01, *** = < .001

(bnonwhite = -.091). In terms of clinical experience, respondents who practiced in more rural settings (b = .013) and counties with higher rates of per capita dispensation of scheduled prescriptions (b = .081) were significantly more concerned. Providers who believed that larger percentages of their patients abused prescription drugs also indicated higher levels of concern (b = .167).

Table 4 details the providers' answers to the prescribing and dispensing practices questions. The vast majority of the physicians, NPs/PAs, and dentists reported prescribing controlled substances in the past 12 months (86.3%, 90.8%, and 91.8%, respectively). Only a minority indicated they had changed their prescribing practices in the past 12 months. Nearly half (47.2%) of the NPs/PAs specified they changed their prescribing practices. In contrast, only about a third (35.8%) of the physicians and even fewer dentists (19.7%) reported having changed their prescribing practices. Of those who reported changing, approximately 90% of the sample indicated prescribing fewer controlled substances in the past year. While significantly fewer physicians, mid-level providers, and dentists dispensed controlled substances compared with the pharmacists, we observed a similar pattern in that approximately one third (35.1%) reported changing their dispensing practices, with the majority (83.5%) indicating they dispensed fewer scheduled prescriptions.

To better understand the relationship between the providers' level of concern and the likelihood of changing their prescribing or dispensing behavior, we used logistic regression. We focused on the likelihood of change because the overwhelming direction of change was toward prescribing/dispensing fewer controlled substances. The results are reported in Table 5. Consistent with the findings reported in Table 4, the multivariate models suggest NPs/PAs were significantly more likely to have changed their recent prescribing and dispensing behavior compared with physicians (Odds ratio [ORs] = 1.563 and 1.829, respectively). Dentists were significantly less likely to report having changed their prescribing or dispensing behavior (ORs = .472 and .419, respectively). Individuals who were working in inpatient clinical settings also were less likely to indicate having changed their practices (ORs = .525 and .220). Higher levels of concern about community prescription drug abuse and perceiving more prescription drug abuse among their own patients were associated with

Table 4. *Changes in prescribing and dispensing practices in past 12 months by provider type and for the total sample (N = 5,846).*

	Physicians (MDs, DOs, and DPMs) (N = 2,375)		Nurse Practitioners (NPs) and Physician Assistants (PAs) (N = 1,041)		Dentists (N = 740)		Pharmacists (N = 1,542)		Total Sample (N = 5,846)	
	N	%	N	%	N	%	N	%	N	%
In the past 12 months:										
Prescribed Controlled Substances (X2 = 25.16, *P* < .001)	2,078	86.3	957	90.8	676	91.8	-	-	3,711	88.4
Changed Prescribing Practices (X2 = 128.49, *P* < .001)	728	35.8	444	47.2	131	19.7	-	-	1,303	35.8
Prescribed Fewer Controlled Substances (X2 = 9.82, *P* < .007)	663	92.7	384	88.5	120	96.0	-	-	1,167	91.6
Dispensed Controlled Substances (X2 = 2504.63, *P* < .001)	466	19.4	174	16.5	109	14.8	1371	90.1	2,120	37.1
Changed Dispensing Practices (X2 = 34.52, *P* < .001)	129	28.3	77	44.8	18	17.3	506	37.6	730	35.1
Dispensed Fewer Controlled Substances (X2 = 26.8, *P* < .002)	112	89.6	68	94.4	14	82.4	398	80.4	592	83.5

higher odds of changing both prescribing (OR = 1.310 and 1.251, respectively) and dispensing behavior (OR = 1.264 and 1.147).

Discussion

The majority of the health care providers surveyed indicated they were very concerned about community prescription drug abuse. Our research, however, reveals that there is a minority of providers who are still relatively unconcerned about the epidemic, particularly among dentists. The comparative lack of concern among dentists contrasts with the American Dental Association's (ADA) policy regarding prescribing pain medication as well as recent assertions regarding dentists' role in curbing prescription drug misuse and abuse (33). The ADA policy states, "Dentists are encouraged to recognize their responsibility for ensuring that prescription pain medications are available to the patients who need them, for preventing these drugs from becoming a source of harm or abuse and for understanding the special issues in pain management for patients already opiate dependent" (34). Across responding health care provider groups, concern appears to be associated with the actual prevalence of controlled substances dispensed in communities as well as, and perhaps more important, the extent that abuse is observed first hand in clinical practice.

The high levels of support may help to explain the speed and relative ease with which most states have been able to implement PDMPs and expand state-level regulation of prescription medications over the last decade. The implementation of these programs, and the associated regulations, could easily be perceived by health care professionals as inappropriate state intrusions into the autonomous practice of medicine. While there is anecdotal evidence of providers who are disturbed by the expansion of government regulation in the health care arena (35,36), the high levels of concern about the negative impact of prescription drug abuse on communities may, in part, explain the lack of resistance to these new policies and regulations from the health care provider community. Many PDMPs also have been designed to provide useful information back to prescribers and dispensers to help them improve the quality of their day-to-day clinical decision-making, which may be welcomed and seen as less threatening, even though in reality, they do expand government's oversight of clinical practice.

More important for public health intervention efforts, our research suggests that a number of health care providers already have voluntarily begun to change their prescribing and dispensing practices in ways that may be reducing the supply of scheduled prescriptions in communities. Our finding that concern about community prescription drug abuse is strongly associated with changes in practice underscore that public health officials should continue, and possibly expand, their efforts to raise awareness across the health care provider community. This may be particularly important within the oral health care system, which historically has not

Table 5. *Logistic regression analysis of providers' reports of changing prescribing and dispensing behavior in past 12 months by provider demographic and practice characteristics and providers' self-reported concern regarding prescription drug abuse.*

	Changed Prescribing Behavior	Changed Dispensing Behavior
	OR	OR
Gender (Female)	.985	.957
Age	.996	.994
Race (Nonwhite)	1.060	1.143
Provider Type (Physician)		
Nurse Practitioner (NP)/Physician Assistant (PA)	1.563***	1.829**
Dentist	.472***	.419**
Pharmacist	--	1.276
Primary Practice Setting (Other)		
Outpatient	1.065	1.004
Hospital	.525***	.220***
Emergency Room	1.079	.748
Primary Practice Location (Rural-Urban)	1.057*	.995
Perceived Patient Misuse/Abuse of Prescription Drugs	1.251***	1.147***
Per Capita County Rate of Scheduled Prescriptions Dispensed	.981	1.033
Concern Regarding Community Prescription Drug Abuse	1.310***	1.264**
-2 Log Likelihood	4440.609	2485.128
Overall X2	309.47***	208.122
Nagelkerke R2	.112	.131

* = < .05, ** = < .01, *** = < .001

been as closely integrated clinically or organizationally with the general health care system (37,38). In doing so, public health leaders could facilitate positive change by helping more providers appreciate the public health impact of day-to-day clinical decision-making.

While there are potential gains to increasing prescribers' and dispensers' concern, our analyses also imply that such efforts alone will probably not be sufficient to drive the large-scale changes in prescribing or dispensing practices necessary to turn the tide on the expanding prescription drug epidemic. About a third of our respondents reported voluntarily changing their behavior, in part, because they simply are more concerned about what is happening in their local communities. In this regard, informational and educational campaigns targeting health care providers should be part of any comprehensive state plan. Public health leaders, however, also should consider other options to encourage a larger proportion of health care providers to exercise even more caution in prescribing and/or dispensing scheduled medications. Many states are exploring and piloting additional strategies, including requiring clinicians to consult PDMP data prior to writing a prescription. Furthermore, some states and health care institutions are offering professional continuing education on alternative pain management strategies (39) as well as free to low cost units on preventing abuse (see, for example, Boston University School of Medicine's www.opioidprescribing.com). Furthermore, professional associations are calling for more detailed guidelines when prescribing abused medications, especially in patients suffering chronic pain (40,41). Finally, boosting continuing education that specifically addresses prescription drug misuse and abuse is in keeping with a number of professional organization's policies, e.g., American Medical Association and the American Dental Association (34,42).

As with all studies, this research has important limitations. While it is a relatively large survey of health care providers, the study was voluntary and may not be generalizable to all health care providers in Indiana. Similarly, the study focused on Indiana, a medium-size Midwestern state with a higher burden of prescription drug abuse than many states (43), and the results may not be generalizable to health care providers in other parts of the country. Finally, the study relied on a single

question to assess providers' concern and a subjective indicator of changes in recent clinical decision-making. Future research should explore providers' views more fully using a more representative sample and explore how these beliefs shape clinical decision-making using longitudinal medical record data.

Conclusions

The findings from this study suggest that more work can be done to encourage health care providers to take action to support public health efforts to reduce the scourge of prescription drug abuse in communities across the nation. While the majority of providers surveyed indicate they are concerned, significant pockets of health care professionals who are relatively unconcerned remain. Increasing providers' concern about the community impact of prescription drug abuse also appears to be an important factor in motivating them to take voluntary action to reduce the availability of scheduled prescription medications in the community. More generally, this research underscores the critical importance of engaging health care providers fully in public health efforts to reverse the course of the prescription drug epidemic.

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Disclosure

Dr. Wright is the PI of the study, has full access to all the data in the study, and takes principal responsibility for the integrity of the data and the accuracy of the data analysis. Dr. Wright and Mr. Kooreman designed the study protocol. Dr. Wright, Ms. Reed, and Mr. Carnes managed the literature searches and summaries of previous related work and collaborated in the development of the first draft of the manuscript. Dr. Wright provided revision for intellectual content and final approval of the manuscript.

Conflict of Interest

All authors have no conflicts of interest to report. None of the authors of the manuscript received any remuneration. Further, the authors have not received any reimbursement or honorarium in any other manner. The authors are not affiliated in any manner with the Indiana Professional Licensing Agency, which funded the overall study informing the present manuscript.

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Role of Sponsor

The financial sponsor of this work had no role in the design and conduct of the study or the collection, management, analysis, and interpretation of the data. The sponsor also did not have a role in the preparation or review of the manuscript or the decision to submit. We also would like to thank the editorial board of *Pain Physician* for review and criticism in improving the manuscript.

Appendix A. Sample comparison.

		Physicians (MDs, DOs, and DPMs)		Nurse Practitioners (NPs) and Physician Assistants (PAs)		Dentists		Pharmacists		Total Sample	
Source & Characteristic		**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**		
Present Study		2,444	41.8	1,067	18.3	753	12.9	1,582	27.0	N = 5,846	
IPLA Application		20,941	56.9	961	2.6	4,354	11.8	10,559	28.7	N = 36,815	
Difference of Proportion Z-score (*P*-value)		-21.5 (~0)*		52.2 (~0)*		2.3 (0.02)*		-2.6 (0.01)*			
Present Study											
Gender										N = 5,666	
Women		683	28.8	919	88.9	155	21.4	833	54.4	2,590	45.7
Men		1692	71.2	115	11.1	570	78.6	699	45.6	3,076	54.3
IPLA Application											
Gender										N = 37,557	
	Women	5,594	27.2	4,738	89.2	891	24.9	4,792	59.4	16,015	42.6
	Men	15,010	72.8	574	10.8	2,681	75.1	3,277	40.6	21,542	57.4
Difference of Proportion Z-score (*P*-value)		-5.7 (~0)*		7.5 (~0)*		1.7 (0.1)		4.0 (~0)*			
Present Study											
Age										N = 5,603	
35 or younger		241	10.3	174	17.0	81	11.2	401	26.4	897	16.0
36-45		464	19.9	269	26.2	123	17.0	315	20.7	1,171	20.9
46-55		606	25.9	304	29.7	192	26.6	328	21.6	1,430	25.5
56 or older		1,026	43.9	278	27.1	327	45.2	475	31.3	2,106	37.6
								$\bar{X}$ = 50.3		s = 12.8	
IPLA Licensure											
Age										N = 40,006	
35 or younger		2,749	13.3	1,550	29.2	736	20.6	3,361	32.1	8,396	21.0
36-45		5,491	26.6	1,438	27.1	740	20.7	2,655	25.4	10,324	25.8
46-55		5,490	26.6	1,312	24.7	802	22.4	2,127	20.3	9,731	24.3
56 or older		6,924	33.5	1,004	18.9	1,302	36.4	2,325	22.2	11,555	28.9
								μ = 48.5		σ = 12.9	
Difference of Mean T-score (*P*-value)										9.8 (~0)*	

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