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Use of Stimulant Diversion Prevention Strategies in Pediatric Primary Care and Associations with Provider Characteristics

Elizabeth A. McGuier, PhD^a, David J. Kolko, PhD^{a,b}, Heather M. Joseph, DO^a, Heidi L. Kipp, MEd^b, Rachel A. Lindstrom, PhD^a, Sarah L. Pedersen, PhD^a, Geetha A. Subramaniam, MD^c, Brooke S. G. Molina, PhD^a

^aDepartment of Psychiatry, University of Pittsburgh School of Medicine, Pittsburgh, PA, USA

^bWestern Psychiatric Hospital, University of Pittsburgh Medical Center, Pittsburgh, PA, USA

^cNational Institute on Drug Abuse

Abstract

Purpose: Diversion of stimulant medications for ADHD is a prevalent problem. Pediatric primary care providers (PCPs) are well-positioned to reduce diversion risk among adolescents prescribed stimulants, but little is known about their use of prevention strategies. The objectives of this study were to describe the frequency with which pediatric PCPs use diversion prevention strategies and examine potential determinants (facilitators and barriers) of strategy use.

Methods: Participants were pediatric PCPs ($N=76$) participating in a randomized controlled trial of stimulant diversion prevention strategies. At baseline, prior to randomization, PCPs rated the frequency with which they used specific strategies in each of four categories: patient/family education, medication management/monitoring, assessment of mental health symptoms/functioning, and assessment of risky behaviors. They completed measures of attitudes toward diversion prevention, subjective norms (i.e., implementation climate), and perceived behavioral control (i.e., knowledge/skill, resource constraints). Associations between determinants and strategy use were tested with correlational and regression analyses.

Results: PCPs used strategies for assessing mental health symptoms/functioning most frequently and patient/family education strategies least frequently. Attitudes about the effectiveness of diversion prevention, implementation climate, knowledge/skill, and resource constraints were positively correlated with use of at least one category of strategies. In regression analyses, PCP knowledge/skill was positively associated with patient/family education, medication management, and risk assessment strategies.

Corresponding author: Elizabeth A. McGuier, Department of Psychiatry, University of Pittsburgh, 545 Bellefield Towers, 100 N. Bellefield Ave., PA, USA 15213. millerea3@upmc.edu. Telephone: 412-246-5904. Fax: 412-246-5341.

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Conclusions: Findings suggest that improving knowledge and skill may increase use of diversion prevention strategies by PCPs. Identifying provider-level determinants of strategy use informs implementation efforts in pediatric primary care and can facilitate efforts to prevent stimulant diversion among adolescents.

Keywords

stimulant diversion; stimulant misuse; pediatric primary care; implementation

Misuse, including overuse and non-prescribed use, of stimulant medications intended for treatment of Attention-Deficit/Hyperactivity Disorder (ADHD) has increased markedly in recent years.[1–3] Rates of nonmedical stimulant use (i.e., without a prescription) are highest among adolescents and young adults, with lifetime use estimates of 9.5% among high school seniors[2] and 17% among college students.[4] The most common source of stimulant medications for nonmedical use is peers with prescriptions.[4–7] Being approached to divert (i.e., asked to give, sell, or trade medication) is relatively common among adolescents with stimulant prescriptions.[8–10] Risk increases with age; in a large survey, 32% of 10–12 year-olds, 33% of 13–15 year-olds, and 54% of 16–18 year-olds with prescriptions reported ever being approached to divert their medication.[9] Mental health symptoms and engagement in risky behaviors have been associated with diversion [4,10], and individual-level risk factors for diversion (e.g., tolerance for misuse/diversion) are greater among older adolescents.[11] Estimates of diversion by adolescents with prescriptions range from 12% to 26%.[9,12] Diversion prevention strategies that target adolescents with ADHD prescriptions may reduce stimulant diversion.

Pediatric primary care providers (PCPs) are well-positioned to deliver stimulant diversion prevention strategies to adolescents. ADHD is most often treated in primary care,[13,14] and brief advice-based interventions delivered by PCPs have been shown to reduce risky behaviors (e.g., tobacco use, risky sexual behavior[15–17]). Given these findings, PCPs' delivery of education and counseling to patients and families (e.g., discussing risks of diversion) may be effective in preventing diversion. Additional strategies that may help prevent diversion include adjusting medication management practices to minimize risk, assessing mental health symptoms and functioning, and assessing risky behaviors. Research into the effectiveness of these strategies is ongoing. One cross-sectional study found that college students who reported their provider frequently addresses the dangers of sharing stimulants were less likely to engage in diversion.[18] In the first study of PCPs as agents of diversion prevention, our research team recently found that diversion risk factors (e.g., intentions to divert, stimulant use disclosure) in college students improved following PCP training in these diversion prevention strategies.[19]

Although pediatric PCPs could play an important role in diversion prevention, we know little about what they are currently doing to reduce diversion risk. Diversion risk is addressed in recent updates to clinical practice guidelines, which suggest monitoring for signs of misuse, discussing safe storage practices, and considering nonstimulant medications with lower abuse potential.[20] However, to the best of our knowledge, no study has examined use of diversion prevention strategies by pediatric PCPs specifically. One study of pediatric

subspecialists (i.e., psychiatrists, neurologists, developmental-behavioral pediatricians) found that 7% used medication contracts and 11% distributed printed materials on misuse/diversion at least some of the time.[21] Subspecialists also reported using medication management strategies including prescribing long-acting stimulants, prescribing non-stimulants, employing pill counts, and prescribing a smaller number of pills; these strategies were used often by 89%, 27%, 16%, and 12% of subspecialists, respectively.[21] A recent study of family physicians and college health professionals found that family physicians were more likely than college health professionals to use strategies to monitor stimulant medication compliance (e.g., state medication registry, pill counts), while college health professionals reported asking about other substance use more often than family physicians. [22] These results increase our knowledge of diversion prevention among providers serving older adolescents and young adults, but research on pediatric PCPs, who commonly treat adolescents with ADHD, is lacking. Describing the frequency with which pediatric PCPs use different categories of prevention strategies can inform future efforts to train PCPs in diversion prevention.

In addition, successful implementation of diversion prevention in primary care requires identification of determinants (i.e., barriers and facilitators) of strategy use that can be targeted in implementation efforts. The Consolidated Framework for Implementation Research identifies individual characteristics (e.g., knowledge, attitudes) as a key domain of determinants.[23] Causal theories of behavior help to elucidate the role of individual characteristics in implementation. The theory of planned behavior proposes that behavior is driven by attitudes, subjective norms, and perceived behavioral control[24,25] and is widely used to explain variation in healthcare professionals' behavior.[26,27] Figure 1 illustrates our conceptual model, based on the theory of planned behavior.

The recent studies mentioned above found high levels of concern about stimulant diversion across provider types,[21,22] suggesting that pediatric PCPs are likely to be similarly concerned and have positive attitudes toward diversion prevention. One study found that attitudes regarding diversion prevention were correlated with more frequent strategy use,[21] providing some support for the importance of attitudes in understanding strategy use. Subjective norms around diversion prevention (i.e., perceived social pressure to engage in diversion prevention) have yet to be examined. Perceived behavioral control refers to perceived ease or difficulty of using diversion prevention strategies. Factors affecting perceived behavioral control include individuals' knowledge and skills, as well as perceptions of external barriers to the behavior. In prior research, subspecialists reported low knowledge, skill, and confidence in preventing stimulant diversion[28,29] and most family physicians indicated they were unprepared to address and prevent misuse/diversion.[22] More broadly, prior research on PCPs' provision of behavioral health care has identified time constraints and reimbursement concerns as common barriers.[30,31] PCPs' perceptions of their knowledge/skill and resource constraints are likely to affect use of diversion prevention strategies. Using theory to identify determinants associated with use of diversion prevention strategies provides relevant targets for future implementation efforts and is an important step toward widespread implementation of diversion prevention in primary care.

Current Study

The first aim of this paper was to describe the frequency with which pediatric PCPs report using diversion prevention strategies, specifically patient/family education, medication management and monitoring, and assessment of patient factors that increase diversion risk (i.e., mental health symptoms and risky behaviors). The second aim was to examine potential determinants of strategy use based on the theory of planned behavior.

We used baseline data from a clinical trial ([NCT03080259](#)) of stimulant diversion prevention strategies in pediatric primary care. We examined associations of PCPs' attitudes toward diversion prevention, subjective norms (i.e., perceived implementation climate for diversion prevention), and perceived behavioral control (i.e., self-rated knowledge/skill and resource constraints) with strategy use (Figure 1). We hypothesized that more positive attitudes regarding diversion prevention, stronger implementation climate, greater knowledge/skill, and less resource constraints would be associated with greater self-reported use of diversion prevention strategies.

Methods

Participants and Practices

Participants were 76 PCPs (54 physicians, 22 advanced practice providers) from seven pediatric practices in southwestern Pennsylvania that belonged to a large healthcare system and participated in a university-hosted practice-based research network (UL1 TR001857). Practices with the highest caseloads of adolescent patients prescribed stimulants for ADHD were approached to participate and agreed to enroll. All practices had on-site behavioral health providers (0.6–1.2 full-time equivalents) and access to child psychiatry consultation and services through the healthcare system.

All providers at each practice were invited to participate in the study, and all but one consented (99% participation). Three PCPs were excluded because they did not prescribe stimulant medications, resulting in a final sample of 76 PCPs. Years in practice ranged from less than 1 year to 45 years ($M = 16.76$ years, $SD = 11.39$; 95% in practice >1 year). Participants were primarily non-Hispanic White (92%); four PCPs identified as Asian and one as Black/African-American. Participants identified as women (71%), men (28%), and nonbinary (1%). Almost all PCPs (93%) reported currently managing adolescents with ADHD.

Data were also collected from 14 behavioral health providers (9 therapists, 3 psychiatrists, 2 care managers). We report descriptive data on their strategy use to provide additional context for PCPs' strategy use. These behavioral health providers are not included in analyses.

Procedures

Participants completed an online survey programmed in Qualtrics (Provo, UT) and emailed individually to providers at baseline. All participants provided informed consent. The study was approved by the University of Pittsburgh Institutional Review Board.

Measures

Diversion Prevention Strategy Use—Participants rated the frequency in the last 6 months with which they engaged in 35 specific behaviors presumed to be directly (e.g., discussing diversion specifically) or indirectly (e.g., assessing risky behaviors) related to diversion. Items assessed the domains targeted by the diversion prevention intervention, which was developed and tested in a prior open trial with PCPs treating college students with ADHD.[19] Items were rated on a 4-point scale (1 ‘Not at all,’ 2 ‘Once,’ 3 ‘More than once,’ 4 ‘Most or all of the time’) and grouped into 4 scales: 1) patient and family education, 2) medication management and monitoring, 3) assessment of mental health symptoms and functioning, and 4) assessment of risky behaviors. All scales had good internal consistency ($\alpha = 0.83\text{--}0.91$), and intercorrelations among scales were moderate ($r = .30\text{--}.62$), indicating they are measuring distinct domains.

Provider-Reported Determinants—Items adapted from the Provider Practices Regarding Tobacco Survey[32–34] were used to assess attitudes toward diversion prevention (i.e., perceived effectiveness, perceived importance), implementation climate (i.e., perceptions that strategy use is expected, supported, and rewarded), knowledge/skill in diversion prevention, and resource constraints (e.g., time, reimbursement). Measures were tailored to diversion prevention strategies by referencing diversion in individual items, as recommended by Weiner and colleagues.[35] Participants rated the extent to which they agreed with each item on a 7-point Likert scale. Table 1 presents items, internal consistency, and descriptive statistics.

Data Analyses

Given clustering of participants within practices, we first calculated intraclass correlation coefficients (ICCs) to determine the proportion of variance accounted for by differences between practices. ICCs for all four outcomes were $<.001$, indicating that multilevel models were not necessary. We examined descriptive statistics for strategy use and used repeated measures ANOVA to test for differences in the frequency with which different types of strategies were used. We used correlations to examine associations between demographic characteristics and strategy use and regression analyses to examine associations of determinants with strategy use. For regression analyses, all determinants were entered together in one block. Because no demographic characteristics were associated with strategy use, demographic variables were not included in regression analyses. We also conducted analyses after removing 4 PCPs who reported managing zero adolescent patients with ADHD. The overall pattern of findings remained the same; we report results for the full sample of 76 PCPs.

Results

Use of Diversion Prevention Strategies

There was substantial variability in PCPs’ use of the four categories of diversion prevention strategies. Table 2 provides mean frequency of use for each individual strategy, as well as the proportion of PCPs who reported using it ‘Most or all of the time’ in the past 6 months (i.e., universal use). A repeated measures ANOVA with Greenhouse-Geisser correction

determined that use differed significantly between categories, $F(2.62, 196.37) = 280.03$, $p < .001$, and post-hoc tests indicated that all categories differed significantly from one another ($p < .001$). Ratings of patient/family education strategies were lowest, with the average rating indicating that PCPs used these strategies less than once in the past 6 months ($M = 1.64$). Strategies for assessing mental health symptoms and functioning were rated most highly ($M = 3.68$). Separately, we examined mean ratings of strategy use among behavioral health providers ($n = 14$). Behavioral health providers reported similar patterns of use (education $M = 1.95$, $SD = 0.53$; medication management $M = 2.39$, $SD = 0.65$; assessment of symptoms/functioning $M = 3.83$, $SD = 0.25$; assessment of risky behavior $M = 3.14$, $SD = 0.76$).

Correlations with Diversion Prevention Strategy Use

Table 3 shows correlations between provider demographics, determinants, and strategy use. Female PCPs had more positive attitudes regarding the effectiveness of diversion prevention and perceived stronger implementation climate. Older PCPs perceived diversion prevention as less important, while female PCPs perceived diversion prevention as more important. Because older PCPs were more likely to be male, we also examined partial correlations of age and gender with perceived importance. Again, older PCPs perceived diversion prevention as less important ($r = -.32$, $p < .01$) and female PCPs perceived it as more important ($r = .26$, $p = .03$). Years in practice was highly correlated with age ($r = .94$) and showed the same pattern of findings. Provider demographics were not significantly associated with use of any category of diversion prevention strategies.¹

More positive attitudes about the effectiveness of diversion prevention in primary care were associated with more frequent use of patient/family education strategies. Greater perceived importance was not significantly associated with strategy use. Implementation climate was significantly positively associated with education, medication management, and risk assessment strategies, and PCPs' knowledge/skill was significantly associated with more frequent use of all strategies. Lastly, greater perceived resource constraints were associated with significantly more use of education strategies.

Associations of Determinants with Diversion Prevention Strategy Use

Table 4 presents regression results. Self-reported knowledge/skill was significantly associated with greater use of patient/family education, medication management, and risk assessment strategies. Attitudes and implementation climate were not significantly associated with any outcome. Contrary to hypotheses, resource constraints were positively associated with use of patient/family education strategies.

Discussion

The first aim of this study was to describe pediatric PCPs' use of stimulant diversion prevention strategies. We surveyed pediatric PCPs participating in a clinical trial of diversion prevention about the frequency with which they utilized diversion prevention strategies,

¹After excluding 4 PCPs who reported managing zero adolescent patients with ADHD, years in practice was significantly correlated with assessment of symptoms/functioning (change from $r = -.04$, $p = .72$ to $r = -.24$, $p = .046$).

specifically patient/family education, medication management, assessment of mental health symptoms/functioning, and assessment of risky behaviors, at baseline. The second aim was to examine provider-level determinants of strategy use. The study findings advance our understanding of pediatric PCPs' actions to reduce diversion risk among adolescents and inform efforts to implement diversion prevention strategies in primary care.

PCPs reported they most frequently engaged in assessment of symptoms/functioning and risky behaviors. Greater use of these strategies is unsurprising given that their use is consistent with published practice parameters for pediatric ADHD and they are not specific to diversion prevention.[20] Patient/family education and medication management strategies, which are more directly related to diversion prevention, were less frequently used. Findings for specific medication management strategies were comparable to frequencies presented by the prior limited research in other provider populations. For example, Colaneri and colleagues[21] found that medication contracts and pill counts were often used by 7% and 16%, respectively, of pediatric subspecialists; in this study, these strategies were used most/all of the time by 4% and 13% of PCPs. Thus, strategies that may be beneficial for preventing diversion, such as discussing remaining pill supply, may be underutilized across provider types.

Future research should consider assessing both the frequency and the quality or intensity of strategy use. We were surprised to find that PCPs and behavioral health providers reported similar frequencies of strategy use. We anticipate that the intensity of their strategy use may differ; for example, behavioral health providers may spend more time on patient education than PCPs. Behavioral health providers may also use other strategies not assessed in this study (e.g., discussing thoughts and feelings about diversion).

Because the effectiveness of these diversion prevention strategies is still under investigation, we cannot yet make recommendations about how PCPs should prioritize their efforts to prevent diversion. Effective diversion prevention may require a tiered approach, with some strategies used universally (e.g., reminder that medication should only be used by the patient) and other strategies only used for patients at high risk (e.g., choosing medication to reduce risk of abuse) or when misuse/diversion is suspected (e.g., monitoring pill supply). Colaneri and colleagues[21] reported that pediatric subspecialists used some strategies (e.g., pill counts) more often for specific patients suspected of misuse/diversion than for patients in general, suggesting a tiered approach. Future research may benefit from asking separately about strategy use for all patients, for patients at high risk, and when misuse/diversion is suspected. Lastly, the appropriateness and effectiveness of diversion prevention strategies may vary by adolescent and family characteristics (e.g., age, gender, engagement in risky behaviors) that should be considered as moderators in effectiveness studies.

After describing strategy use among pediatric PCPs, we examined potential determinants. Informed by the theory of planned behavior, we examined attitudes regarding the effectiveness and importance of diversion prevention, implementation climate for diversion prevention, knowledge/skill, and resource constraints. Overall, pediatric PCPs had positive attitudes regarding the importance of diversion prevention and the effectiveness of diversion prevention in primary care, with female PCPs reporting more positive attitudes than male

PCPs. This finding is consistent with prior research showing more positive attitudes toward behavioral health among female PCPs compared to male PCPs.[36,37] Older age was also associated with less perceived importance, perhaps reflecting increased integration of behavioral health into medical training over time.[38]

PCPs' ratings of knowledge/skill, implementation climate, and resource constraints were relatively low, with average ratings close to the scale midpoint (i.e., neither agree nor disagree). These results are similar to those finding low knowledge, skill, and confidence in preventing stimulant diversion among other types of medical providers.[22,28,29] However, ratings for attitudes indicated PCPs generally viewed diversion prevention positively, especially the importance of diversion prevention. Perceived importance and perceived effectiveness were strongly correlated, perhaps because PCPs who view diversion as more problematic may be more likely to believe they can do something about it. In addition, the average rating for resource constraints was at the scale midpoint (i.e., neither agree nor disagree), and resource constraints were not significantly associated with attitudes, implementation climate, or knowledge/skill. This pattern of findings suggests that pediatric primary care is likely to be a hospitable context for implementing diversion prevention – PCPs believe diversion prevention is important, there is room for improvement in knowledge/skills and implementation climate, and resource constraints are not strongly endorsed.

When testing determinants of diversion prevention strategy use, PCP knowledge/skill showed the strongest and most consistent associations. Knowledge/skill was significantly associated with greater use of patient/family education, medication management, and risk assessment strategies in both correlational and regression analyses. These results suggest that knowledge/skill may be the most proximal determinant among those examined and that increasing PCPs' knowledge and skill may be crucial for increasing use of diversion prevention strategies. Implementation climate was correlated with 3 of 4 categories of strategy use but not significantly associated with any category in regression analyses, perhaps because of its relatively strong association with knowledge/skill. Longitudinal analyses could test if positive implementation climate indirectly affects strategy use by facilitating acquisition of knowledge and skills that directly impact strategy use.[39]

Contrary to hypotheses, attitudes were only weakly correlated with strategy use and not significantly associated with any category of strategy use in regression analyses. The relatively high scores for attitudes, especially for perceived importance, may have limited our ability to find associations between attitudes and strategy use. It is possible that positive attitudes are necessary but not sufficient to support use of diversion prevention strategies. Lastly, resource constraints were unexpectedly positively associated with use of patient/family education strategies, and this association remained significant after accounting for the contribution of other determinants. PCPs who provide education more frequently may be more aware of time and reimbursement constraints than those who provide education less frequently. Longitudinal analyses are needed to test how resource constraints predict changes in strategy use over time. The low reliability of our measure, which assessed a variety of resource constraints (i.e., time, insurance reimbursement, patient needs), suggests that more specific measures of resources may be useful in future research. Qualitative data

from PCPs may also help to identify ways in which specific types of resource constraints affect diversion prevention efforts and generate ideas for addressing barriers.

Although our data are limited to a relatively small sample of PCPs in one region, participation in the study was excellent, minimizing potential bias. The gender balance is comparable to national data (70% female nationally), but only a few PCPs in this study identified as racial or ethnic minorities (8% vs. 29% nationally)[40], which may limit generalizability. PCPs' ratings for use of diversion prevention strategies utilized a 4-point scale combining absolute and relative frequencies (1 'Not at all,' 2 'Once,' 3 'More than once,' 4 'Most or all of the time') and may have been affected by the frequency of patient contact, which was not assessed. Lastly, we found little practice-level variation in use of diversion prevention strategies, possibly because our sample was limited to seven practices belonging to one large health system. A larger, more diverse sample of practices is needed to explore how practice-level factors are associated with PCPs' strategy use.

Overall, our findings indicate that knowledge and skill regarding stimulant misuse and diversion are strongly associated with use of diversion prevention strategies among pediatric PCPs. Specifically targeting knowledge and skill in implementation efforts may increase use of diversion prevention strategies by pediatric PCPs. In future analyses of this sample, we will test if training in diversion prevention strategies changes PCPs' attitudes, knowledge/skill, implementation climate, and perceived resource constraints. We also plan to use these longitudinal data to examine associations between determinants and strategy use over time. Identifying determinants of diversion prevention strategies will facilitate targeted implementation interventions to increase use of stimulant diversion prevention strategies in pediatric primary care.

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Implications and Contributions:

Pediatric primary care providers are well-positioned to prevent stimulant diversion among adolescents. This study examined providers' use of diversion prevention strategies and factors associated with use. Provider knowledge/skill regarding diversion prevention was strongly associated with strategy use and could be targeted in efforts to implement diversion prevention in primary care.

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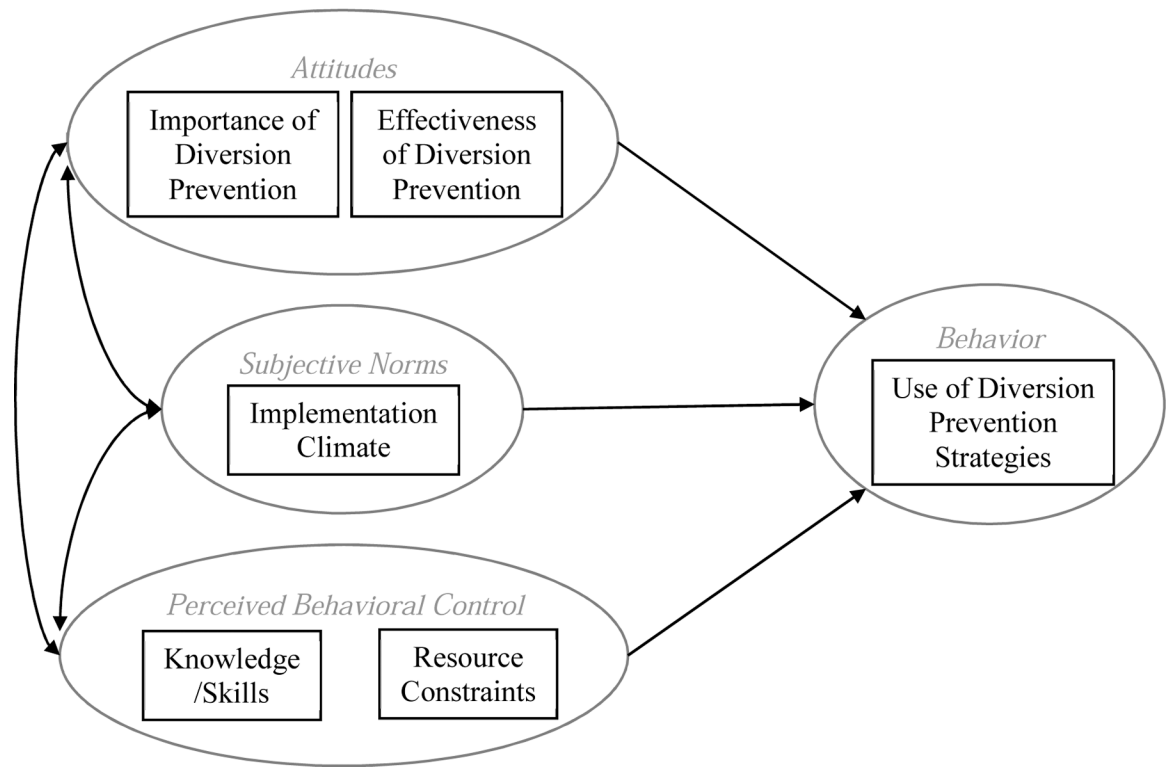


Figure 1.
Conceptual Model of Diversion Prevention Strategy Use

Table 1

Items and Descriptive Data for Provider-Rated Determinants

Construct and Items	Number of items	Alpha	Mean (SD)
Attitudes: Effectiveness	4	0.88	5.47 (0.92)
<i>Providers can play an important role in decreasing stimulant misuse and diversion.</i>			
<i>Prescribing physicians can be effective in preventing stimulant misuse and diversion by their patients.</i>			
<i>Providing follow up counseling about misuse and diversion of stimulants will help decrease misuse and diversion of stimulants.</i>			
<i>Provider counseling about stimulant misuse and diversion can be a cost-effective intervention.</i>			
Attitudes: Importance	3	0.80	6.24 (0.73)
<i>Stimulant misuse and diversion is an important problem.</i>			
<i>Using stimulants without a prescription is dangerous.</i>			
<i>The health and legal risks of stimulant misuse and diversion are concerning enough to consider adjusting my clinical practice.</i>			
Implementation Climate	5	0.64	4.17 (0.84)
<i>In this practice, people want to find ways to decrease risk of stimulant misuse and diversion.</i>			
<i>In this practice, there is concern about misuse and diversion of stimulant medication.</i>			
<i>In this practice, there are resources to implement new strategies that might benefit our patients, such as those that might decrease risk of stimulant misuse and diversion.</i>			
<i>In this practice we receive recognition and appreciation when implementing new clinical strategies to address issues such as stimulant diversion and misuse.</i>			
<i>In this practice, patient education about stimulant diversion and misuse takes a back seat to other issues.</i>			
Knowledge/Skill	3	0.88	3.79 (1.32)
<i>I know the appropriate questions to ask when providing counseling regarding stimulant misuse and diversion.</i>			
<i>I know how to prescribe ADHD medication to decrease misuse and diversion of stimulant medication.</i>			
<i>I have the skills to monitor and assist patients who are misusing and/or diverting their stimulant medication.</i>			
Resource Constraints	4	0.58	3.96 (0.88)
<i>I have insufficient time to address stimulant misuse and diversion with my patients.</i>			
<i>I receive insufficient reimbursement for addressing clinical complexities such as stimulant misuse and diversion.</i>			
<i>The patients we see in our practice have so many other problems in their lives that addressing stimulant misuse and diversion is a very low priority for them.</i>			
<i>Insurance issues for some of my patients create problems when I try to adjust medication to decrease risk of misuse and diversion.</i>			

Note: Items were rated on a 7-point scale: 1 'Strongly Disagree,' 2 'Disagree,' 3 'Somewhat disagree,' 4 'Neither agree nor disagree,' 5 'Somewhat agree,' 6 'Agree,' 7 'Strongly Agree.'

Table 2

Primary Care Providers' Use of Diversion Prevention Strategies

	Mean (SD)	% Most or All of the Time
Patient/Family Education ($\alpha = 0.91$, 13 items)	1.64 (0.65)	
Discuss using stimulant medications with alcohol and other illicit drugs	2.22 (1.20)	19.7
Remind your patient that his/her medication is only to be used by them	2.36 (1.10)	15.8
Discuss safe storage of stimulant medication (e.g., secure, private, or locked location)	2.01 (1.09)	11.8
Discuss your patient keeping his/her ADHD diagnosis and its treatment private	1.88 (1.06)	10.5
Explain that sharing or selling your medication can get your patient in trouble at school or with the law	1.68 (1.02)	9.2
Explain that if your patient shares or sells his/her medication that he/she will not have enough when it is needed most	1.62 (0.98)	6.6
Discuss that your patient's medication may be dangerous for your patient's friends to use	1.42 (0.88)	5.3
Explain that it is likely that your patient will be approached to sell or share his/her stimulant medication	1.59 (0.91)	3.9
Explain to your patient that sharing or selling his/her medication can negatively affect their reputation	1.34 (0.79)	3.9
Discuss what your patient might say if someone asks him/her for their pills	1.39 (0.80)	2.6
Explain that your patient's medication may not help his/her friends as much as they think it will	1.28 (0.72)	2.6
Explain that if word gets out that your patient shares his/her medications that people he/she doesn't know or like will ask for their medication	1.26 (0.70)	2.6
Discuss increased monitoring of sharing and selling stimulant medication by schools	1.25 (0.68)	2.6
Medication Management ($\alpha = 0.83$, 9 items)	2.37 (0.61)	
Ask if your patient is taking his/her medication as prescribed	3.51 (0.86)	68.4
Discuss the need to call the office if your patient needs a prescription adjustment (i.e., not changing how he/she takes medication without consulting you)	3.37 (0.98)	63.2
Explain your refill policy, if any (e.g., calling in ahead of time for refills, how frequently refills may be obtained, replacement of lost prescriptions)	3.28 (0.96)	53.9
Discuss your patient being open and honest with you and maintaining ongoing communication	3.09 (1.11)	47.4
Discuss your patient using up most of his/her remaining pills before filling a new prescription	2.12 (1.20)	17.1
Ask how many pills your patient has remaining at home	2.20 (1.10)	13.2
Set up a contract that states what will happen if my patient uses his/her ADHD medication inappropriately (e.g., termination of treatment)	1.18 (0.67)	3.9
Discuss changing or choosing your patient's medication to reduce risk of abuse	1.50 (0.89)	2.6
Discuss choosing or changing your patient's medication based on a urine drug screen	1.12 (0.49)	1.3
Assessment of Mental Health Symptoms and Functioning ($\alpha = 0.83$, 7 items)	3.68 (0.43)	
Ask about grades in school	3.89 (0.42)	92.1
Ask about extracurricular activities (e.g., athletics, band, etc.)	3.78 (0.60)	84.2
Ask about sleep habits	3.79 (0.55)	84.2
Ask about stimulant side effects	3.79 (0.52)	82.9
Ask about ADHD symptoms	3.78 (0.53)	81.6
Ask about other mental health symptoms such as mood or anxiety	3.43 (0.68)	52.6
Ask about friends	3.32 (0.88)	52.6
Assessment of Risky Behaviors ($\alpha = 0.91$, 6 items)	3.19 (0.79)	
Ask about alcohol use	3.42 (0.82)	60.5
Ask about use of cigarettes and other tobacco products	3.39 (0.87)	60.5

	Mean (SD)	% Most or All of the Time
Ask about marijuana and other drug use	3.33 (0.94)	59.2
Ask about sexual activity and protection against STDs	3.18 (0.96)	47.4
Ask about driving habits	2.91 (1.10)	36.8
Ask about any disciplinary history	2.91 (1.05)	32.9

N = 76. Note: Items were rated on a 4-point scale: 1 'Not at all,' 2 'Once,' 3 'More than once,' 4 'Most or all of the time.' Items are presented based on response frequency and do not reflect the order of administration.

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Table 3

Intercorrelations among Demographics, Independent Variables, and Outcomes

	2	3	4	5	6	7	8	9	10	11	12	13
1. PCP age	.94**	-.27*	.00	-.11	-.38**	-.08	.09	-.14	-.05	-.04	-.02	-.10
2. Years in practice		-.30**	-.03	.13	-.40**	-.10	.10	-.17	-.03	.01	-.04	-.12
3. Gender (<i>0 = Male, 1 = Female</i>) [†]			.17	.25*	.33**	.29*	.06	-.00	.21 ⁺	.02	-.04	.18
4. Racial/ethnic minority status (<i>0 = Nonminority, 1 = Minority</i>)			.18	.08	.08	.01	.02	.10	.17	.10	.15	.03
5. Attitudes: Perceived Effectiveness			.53**	.38**	.25*	.27*	.20 ⁺	.17	.20 ⁺	.17	.21 ⁺	.21 ⁺
6. Attitudes: Perceived Importance			.36**			.16	-.10	.06	.09	-.01	.21 ⁺	.21 ⁺
7. Implementation Climate			.38**			-.02	.32**	.34**	.13	.28*	.28*	.28*
8. Knowledge/Skill			.03			.56**	.53**	.27*	.37**	.27*	.37**	.37**
9. Resource Constraints			.24*			.13	.20 ⁺	.11	.11	.20 ⁺	.11	.11
10. Patient/Family Education			.56**			.30**	.42**	.42**	.42**	.42**	.42**	.42**
11. Medication Management			.48**			.47**	.47**	.47**	.47**	.47**	.47**	.47**
12. Assessment of Mental Health Symptoms and Functioning			.62**			.62**	.62**	.62**	.62**	.62**	.62**	.62**
13. Assessment of Risky Behaviors												

** $p < .01$

* $p < .05$

⁺ $p < .10$

[†] Correlations with gender exclude 1 participant who identified as nonbinary (n = 75).

Table 4

Results of Regression Analyses for Diversion Prevention Strategy Use

	Patient/Family Education			Medication Management			Assessment of Mental Health Symptoms and Functioning			Assessment of Risky Behaviors		
	B	SE	β	B	SE	β	B	SE	β	B	SE	β
Attitudes: Perceived Effectiveness	.12	.08	.17	.04	.08	.06	.08	.06	.17	.03	.11	.03
Attitudes: Perceived Importance	-.11	.10	-.12	-.06	.10	-.07	-.07	.08	-.13	.12	.14	.11
Implementation Climate	.10	.08	.12	.12	.08	.17	.01	.07	.03	.12	.12	.12
Knowledge/Skill	.24	.05	.48**	.21	.05	.46**	.08	.04	.23 ⁺	.17	.07	.29*
Resource Constraints	.16	.07	.22*	.07	.07	.11	.09	.06	.17	.10	.10	.11
R^2	.40			.32			.13			.18		
Adjusted R^2	.35			.27			.07			.13		
F for Change in R^2 from Null Model	9.22**			6.56**			2.09 ⁺			3.15*		

** $p < .01$

* $p < .05$

⁺ $p < .10$