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Academic Detailing Increases Prescription Drug Monitoring Program Use Among Primary Care Practices

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Abstract

Background: Clinical review of a Prescription Drug Monitoring Program (PDMP) is considered a valuable tool for opioid prescribing risk mitigation; however, PDMP utilization is often low, even in states with mandatory registration and use policies.

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Conflicts of Interest:

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Prior Presentations:

There are none to report.

Objective: To evaluate the impact of an Academic Detailing (AD) outreach intervention on PDMP use among primary care prescribers.

Methods: AD intervention was delivered to primary care based controlled substance prescribers (n=87) and their associated PDMP delegates (n=42) by a clinical pharmacist as one component of a large-scale, statewide initiative to improve opioid prescribing safety. Prescriber PDMP use behavior was assessed by prescriber self-report and analysis of objective 2016 – 2018 PDMP data regarding number of monthly report requests. We compared means between pre and post intervention using a paired t-test and plotted the monthly average reports over time to assess trend of mean reports over time. Generalized linear mixed model (GLMM) with a Negative Binomial distribution was used to assess the difference in the trend and magnitude of the combined count of reports for the entire sample and prescriber subsets that were segmented based on adoption status of PDMP.

Results: The monthly mean of reports by combined prescribers and delegates significantly increased following the AD intervention (mean 28.1 pre vs. 53.0 post; $p<0.0001$), with the increase in delegate reports (mean 17.1 pre vs. 60.0 post; $p<0.0001$) driving the overall increase. Reports were requested 40.4 times more often than in the pre-intervention period ($p<0.0001$). Patterns of pre to post changes in mean monthly report requests differed by baseline PDMP adoption status.

Conclusions: The AD intervention was transformative in terms of facilitating practice change to utilize delegates to run reports. Visits with both prescribers and delegates, including hands-on PDMP training and registration assistance, can be viewed as beneficial for practice facilitation.

Keywords

Academic Detailing; Educational Outreach; Opioid Prescribing; Prescription Drug Monitoring Program

INTRODUCTION

Opioid abuse has been declared a public health emergency and continues to be a major driver of the decline in US life expectancy [1, 2]. Although illicit and synthetic opioids have increasingly become the major drivers of overdose rates, prescription opioid abuse is a persistent problem and has been identified as a risk factor for transition to illicit opioid dependence and unintentional overdose [3–5].

Clinical review of a Prescription Drug Monitoring Program (PDMP) is widely considered a best practice in pain management that can be used as a tool to identify and address patients with prescriptions from multiple prescribers, risky drug combinations, and high opioid doses [6, 7]. However, some prescriber groups have low utilization of the PDMP system, even in states with mandatory PDMP registration and use, with workflow concerns and the perception that use of PDMP is burdensome being frequent barriers to general acceptance [8–13]. To promote PDMP use, 37 states (including South Carolina) allow view-only access by unlicensed delegates – persons employed or supervised by a prescriber or pharmacist who granted them access to query the PDMP system on their behalf.

Academic Detailing (AD) can play an important role in increasing the effective use of PDMPs, as well as the uptake of other monitoring strategies for safer opioid prescribing [14]. AD is direct educational outreach to clinicians from pharmacists, physicians, and other healthcare professionals trained in the social marketing of evidence-based recommendations and systematically educated on each clinical topic shared at individualized, interactive office visits, paired with engaging print materials to reinforce key messages [15–18]. This educational outreach approach to change or validate practice behavior predominantly seen in primary care is adaptable to multiple healthcare settings, including the Veterans Administration, hospitals, pharmacies, and nursing homes[19–23].

OBJECTIVE

To date, AD interventions have demonstrated significant impact across a range of provider behavior [19, 24–29]; however, little is known regarding the impacts of AD among professionals at various stages of adoption of targeted healthcare innovations/practice behavior [30–32]. The current project examines the impact of an AD intervention delivered as one component of a large-scale, statewide initiative to improve opioid prescribing safety on prescriber's PDMP use behavior, as a function of pre-intervention adoption status (Early Adopters, Middle Adopters, Late Adopters), utilizing both prescriber self-report and analysis of objective data from South Carolina's (SC) PDMP (SCRIPTS).

METHODS

Study Sample

AD was implemented from June 2017 through January 2018 in six SC counties by a clinical pharmacist academic detailer (detailer). The detailer received individualized preparation for the intervention based on The Drug and Therapeutics Information Service (DATIS) and National Resource Center for Academic Detailing (NaRCAD) training models in a "train the trainer" format [33, 34]. A list of 85 adult primary care prescribers in four primary counties were provided by the SC Department of Health and Environmental Control (DHEC). On-site cold calls to the individual practices resulted in 37 completed prescriber visits. Revisions and additions to the initial prescriber list included: deletion of prescribers no longer at the practices; addition of newcomers at the DHEC-identified practices (32 completed visits); add-ons from new practices identified by the detailer (8 completed visits), add-ons identified by the detailer due to proximity (8 completed visits), and requests from prescribers visited in one of the four primary counties (2 completed visits).

Intervention

AD visits integrated content from a pilot project in SC that utilized AD to improve use of the PDMP as one means to reduce prescription opioid abuse and overdose in the military and the Centers for Disease Control and Prevention (CDC) Prescription Drug Overdose Prevention for States initiative [14, 35, 36]. The resulting key messages highlighted the importance of: (1) sharing a patient provider agreement (PPA); (2) optimizing patient treatment (drug/non-drug) using a multi-dimensional rating scale; and, (3) screening for appropriate opioid use and the continued need for opioid therapy, including hands-on training regarding PDMP

report requests. AD tools were shared to support the key messages and assist with documentation. The overall tenets that framed AD visits included: (1) individualizing discussion of key clinical messages; (2) sharing unbiased, concise, easy-to-use print materials to support interactive discussions, (3) identifying or developing additional provider and patient tools to offer prescribers to support key messages; and, (4) providing continuing medical education (CME) *AMA PRA Category I Credit(s)*™ to reinforce key messages.

Measures

Prescriber feedback on the perceived value of the intervention and intent to change practice behaviors was collected by the CME Assessment Form completed at the end of the AD visit. The CME assessment incorporated two measurable objectives based on two of the three key messages (use of PDMP and of a multi-dimensional rating scale to assess chronic pain patients) and one free text option to record other intended post-visit changes.

A de-identified extract of prescribing practice data for the participating prescribers was provided by Appriss Health (Louisville, Kentucky), the PDMP vendor for SC DHEC, to assess PDMP behavior change since the AD visit. For each prescriber, we requested data for 8 calendar months prior to the month of the AD visit, for the month of the AD visit, and for 6 calendar months after the AD visit month (15 calendar months per prescriber). Key variables in the dataset supplied for each of the 15 months included: (1) total monthly count of patient report requests generated by the prescriber who received an AD visit; (2) total monthly count of patient report requests generated by each of the detailed prescriber's delegates (prescribers could authorize multiple clinic staff as delegates to access and run PDMP reports for their patients); (3) total monthly count of dispensed opioid prescriptions written by the detailed prescriber; and, (4) total monthly count of unique patients with one or more dispensed opioid prescriptions written by the detailed prescriber in the given month. Data use was approved by SC DHEC, and the Institutional Review Board at our institution deemed this "not human research."

Statistical Analyses

Analyses were performed on data collected October 2016 – July 2018. Univariate descriptive statistics and frequency distributions were calculated to describe the sample population of primary care prescribers visited. We compared means between pre-and-post intervention using a paired t-test and plotted the monthly average reports over time to assess trend of mean reports over time. Generalized linear mixed model (GLMM) with a Negative Binomial distribution[37] (Supplementary Technical Details of the Model) was used to assess the difference in the trend and magnitude of the combined count of reports for the prescriber and all his/her delegates ("PCP + DEL") between pre- and post-intervention periods for the entire sample and prescriber subsets that were segmented based on the average of the monthly mean of reports requested by the practice group in the 8 months prior to the AD intervention; i.e., adoption status of PDMP. The three prescriber subsets used to classify prescriber behavior prior to an AD visit were loosely based on the Diffusion of Innovation theory [30]: "Early" Adopters (practices requesting an average of 25 or more reports per month prior to the AD visit; n=26); "Middle" Adopters (practices requesting an average between 1 and less than 25 reports per month prior to the AD visit; n=24); and "Late"

Adopters (practices requesting an average of fewer than 1 report per month prior to the AD visit; n=33). The model was also used to assess the difference in reports requested pre to post intervention for PCP only ("PCP"). The potential correlation of monthly data due to clustering by prescriber was accounted for by using a random intercept [38]. We included time (month), intervention (pre- vs post-intervention period) and their interaction with the potentially confounding covariate of number of dispensed opioid prescriptions as fixed effects. The month of the AD visit was included in the post-intervention period. A separate GLMM was fitted for the count of reports run solely by delegates ("DEL"). Patient counts and the number of dispensed opioid counts were not included in the DEL model as attribution of patients or opioid prescriptions to DEL was not possible. Thus, for the DEL model, we used the count of reports as an outcome with no adjustment for number of patients or prescriptions. For both models, the rate ratio (RR) and its corresponding 95% confidence interval were estimated using maximum likelihood. In each model, we estimated the between prescriber variability using the variance of the random intercept [39]. Poisson and Negative Binomial distributions were compared using the Bayesian Information Criterion (BIC) (Supplementary Table 1) and we compared parametric models for trend over time (linear versus quadratic) using a likelihood ratio test.

RESULTS

A total of 129 AD visits took place, representing visits with 87 unique prescribers, as well as an additional 42 visits with prescriber-authorized PDMP delegates. The mean and median lengths of prescriber visits were 53 minutes and 51 minutes, respectively (minimum 10 and maximum 80 minutes). Delegate visit lengths were not recorded. Of note, 28 (67%) delegates and 24 (28%) prescribers registered to use SCRIPTS for the first time during the AD visit.

Seventy-seven of the 87 (89%) visited prescribers completed the CME assessment form immediately following the AD visit. Thirty-nine percent (n = 30) self-reported use of SCRIPTS and 8% (n = 6) reported use of a multi-dimensional rating scale prior to the AD intervention; behavioral intent to use SCRIPTS and use a multi-dimensional rating scale increased to 99% (n = 76) and 91% (n = 70), respectively. Forty-seven percent (n = 36) noted other intended practice behavior changes consistent with guideline recommendations.

Four of the 87 prescribers visited had no data returned from Appriss and were therefore excluded from the PDMP data analysis: two had no dispensed controlled substances, one had no dispensed opioids, and one had an apparent mismatch on identifier. Table 1 shows univariate descriptive results for the remaining 83 prescribers and their delegates included in the final analysis data set. The monthly mean of report requests by combined PCP + DEL significantly increased following the AD intervention (mean 28.1 pre vs. 53.0 post; $p<0.0001$), with the increase in DEL report requests (mean 17.1 pre vs. 60.0 post; $p<0.0001$) driving the overall increase. The mean change for PCP only was also significant (mean 21.5 pre vs. 29.9 post; $p=0.0345$). There was no statistical difference pre to post in the monthly mean dispensed opioid prescriptions ($p=0.4419$) or counts of patients dispensed opioids ($p=0.5315$).

Table 2 presents findings on the 83 prescribers segmented by PDMP adoption status. The pre-post average increase of monthly mean report requests for the PCP was significant only among Late Adopters (p=0.008). The average pre-post increase for DEL was significant among Early Adopters (p=0.006), Middle Adopters (p=0.046), and Late Adopters (p=0.028). Early, Middle, and Late Adopting prescribers utilized 34, 18, and 11 authorized delegates to request PDMP reports, respectively. The average increase in pre to post mean of monthly mean report requests for the PCP + DEL was significant among Early Adopters (p=0.013), Middle Adopters (p=0.008), and Late Adopters (p=0.003). Figure 1 shows pre-to-post changes were largely driven by increases in delegate-run reports.

Table 3 presents the rate ratio and 95% Confidence Interval (CI) estimates of the association between requesting PDMP reports and the AD intervention for PCP + DEL and PCP model. The model was estimated for the overall sample as well as three subsets created by adoption status, with the number of dispensed opioids as the potentially confounding variable after testing for interactions. Results returned with number of patients per prescriber who filled an opioid prescription written by the prescriber as the confounding variable were very similar (Supplementary Table 2). Although the rate of monthly increase in the post-intervention period was lower than in the pre-intervention period (RR of 0.72, 0.80, 0.66, 0.79 for PCP + DEL; 0.67, 0.77, 0.58, 0.76 for PCP), reports were requested more often in the post-intervention period than in the pre-intervention period (RR of 40.35, 4.98, 29.41, 247.60 for PCP + DEL; 64.51, 6.05, 65.22, 279.82 for PCP) for overall, Early, Middle, and Late Adopters, respectively. All results were statistically significant. The DEL model estimates were not reported as the sample size for fitting the model in DEL-only subset analysis was very small.

The level of fluctuations in the pre- and post-intervention periods among the overall sample were estimated by the reduction in variance of the random intercept in the GLMM. A 52%, 42%, and 88% reduction in monthly report request variation (heterogeneity) among prescribers from pre- to post-intervention period was seen in the PCP + DEL, PCP, and DEL groups, respectively (Supplementary Table 3).

DISCUSSION

To the authors' knowledge, this study was one of the first to evaluate the effects of an AD intervention in primary care on PDMP registration and report request behavior. Consistent with prior AD research, the vast majority of participants found the AD visit valuable to their practice, the AD intervention had a noteworthy impact on practitioner's behavioral intent to implement recommended best practice, and the intervention led to a sizeable adoption of the practice behaviors promoted at AD visits for safer opioid prescribing [14, 35]. Prescribers' willingness to spend, on average, 53 minutes with the detailer during the course of a busy workday further supports the perceived value of the AD individualized person-to-person approach.

Nearly 2 out of 7 prescribers visited over the 8-month intervention period registered to use SCRIPTS for the first time. Of note, payer policies mandating PDMP use were put into place almost fifteen months prior to the first AD visit and a legislative mandate was issued in

the month preceding the first AD visit. Sixty-seven percent of the practice-identified delegates visited by the detailer were also first-time registrants. PDMP-authorized delegates, a feature of most state PDMPs, enable prescribers to overcome perceived workflow barriers that prevent integration of "report requesting" into daily practice [9, 40, 41]. Visits with both prescribers and delegates, including hands-on PDMP training and registration assistance, might be viewed as practice facilitation; we view this as AD support to help with the implementation of guideline recommendation key messages.

Objective data regarding PDMP use behavior (i.e., report running) was largely consistent with self-reported intent to increase PDMP use. An overall acceptance and increased adoption of PDMP use is indicated by: (1) prescriber and delegate registration rates during AD visits; and, (2) significant overall increases in report requests among each prescriber grouping (PCP, DEL, and PCP+DEL). Our findings are largely consistent with prior work demonstrating that AD can improve quality of care in multiple clinical areas, including safer opioid prescribing, and is one educational strategy suggested by the CDC to change practice behavior [20, 24, 29, 42–50].

Our project extends prior work by examining the impact of an AD intervention on PDMP use specifically as a function of participants' baseline PDMP adoption status. Of particular note, the largest increases in requests were demonstrated among the "low/no prior report running" Late Adopters, with the majority of increase in requests being driven by practices that incorporated the use of delegates in the workflow. Longer sustained increases in report requests were demonstrated by the delegates of Early and Middle Adopting practices. Taken together, results suggest that future AD interventions in this area may maximize impact via focus on delegate training for practices already exhibiting some extent of PDMP use and focus on prescriber training for Late Adopting practices. Application of the diffusion of innovations framework may be useful in tailoring the highly flexible AD intervention model to the specific needs of a given practice/practitioner [30].

Limitations

The current project had several limitations worth noting. Though anticipated, barriers to scheduling AD visits required time-intensive efforts to establish initial contact with prescribers and limited the number of participants in this analysis. Because these findings represent programmatic evaluation rather than a controlled intervention, participant recruitment evolved dynamically, did not adhere to strict inclusion/exclusion criteria, and the lack of a formal control group limits causative conclusions regarding the impact of the AD intervention. PDMP reports may be requested for controlled substance prescriptions other than opioids and we only controlled for opioids. Additionally, the timespan of the study limits our ability to speak to sustainable change in prescriber monitoring strategies beyond a 6-month timeframe. Trajectory data presented in Figure 1 suggests that immediate increases in target behavior may begin to taper over time; however, we do not have the data to speak to whether this decrease over time is a result of fewer successful requests or more efficiency in requesting reports. Future work may be indicated to explore the utility of AD follow-up sessions to promote sustained practice behavior change. Though previous AD evaluation work has demonstrated correlations between self-reported behavioral intent and opioid

prescribing behavior [51], self-report data provided in the CME assessment could not be linked with de-identified PDMP data; therefore, we cannot report the correspondence between behavioral intent and PDMP request behavior. Lastly, AD visits were one component of a multifaceted approach to enhance opioid prescribing and pain management guideline uptake and curb diversion and abuse of narcotics. The current study is unable to include or control for additional approaches as all data delivered were stripped of potential identifiers, including exact date of AD intervention. However, findings should be considered in the context of these potentially confounding legislative, public health, and payer-based initiatives and interventions.

CONCLUSION

Curbing the opioid epidemic while maintaining appropriate pain management options requires a multi-factorial approach to change behavior and close educational gaps that prevent the adoption of best practices when prescribing opioids in primary care practices. This study offers 3 primary implications for general practice: (1) The AD intervention appears nimble in its ability to “meet providers where they are” with respect to PDMP adoption, resulting in behavior changes across providers; (2) AD intervention appears to have direct impact on PDMP behavior among providers in the “Late Adopters;” (3) Conversely, AD intervention appears to contribute the largest increase in PDMP report queries when delegates of Early Adopting practices are detailed. The impact of a one-time AD intervention reflected by the current findings are encouraging and should be replicated and extended by future controlled research, as well as program evaluation, that assess the impact of repeat AD visits to effect sustainable practice behavior change.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Abbreviations:

AD	Academic Detailing
BIC	Bayesian Information Criterion
CDC	Centers for Disease Control and Prevention

CME	Continuing Medical Education
DEL	Delegate
GLMM	Generalized Linear Mixed Model
NB	Negative Binomial
PCP	Primary Care Prescriber
PDMP	Prescription Drug Monitoring Program
PPA	Patient Provider Agreement
RR	Rate Ratio
SC	South Carolina
SCRIPTS	South Carolina Reporting & Identification Prescription Tracking System (SC PDMP)
SC DHEC	South Carolina Department of Health and Environmental Control

REFERENCES

1. U.S. Department of Health & Human Services. HHS Acting Secretary Declares Public Health Emergency to Address National Opioid Crisis. Accessed at https://www.hhs.gov/about/news/2017/10/26/hhs-acting-secretary-declares-public-health-emergency-address-national-opioid-crisis.html, 7 8, 2020.
2. Woolf SH and Schoomaker H. Life Expectancy and Mortality Rates in the United States, 1959-2017. Jama. 2019;322(20):1996–2016. [PubMed: 31769830]
3. Cicero TJ, Ellis MS, Kasper ZA. Increased use of heroin as an initiating opioid of abuse. Addict Behav. 2017;74:63–66. [PubMed: 28582659]
4. Hedegaard H, Miniño AM, Warner M. Drug Overdose Deaths in the United States, 1999-2018. NCHS Data Brief. 2020 1(356):1–8.
5. Vivolo-Kantor AM, Hoots BE, Scholl L et al. Nonfatal Drug Overdoses Treated in Emergency Departments - United States, 2016-2017. MMWR Morb Mortal Wkly Rep. 2020;69(13):371–76. [PubMed: 32240125]
6. Centers for Disease Control and Prevention. Opioid Overdose: What States Need to Know about PDMPs. Accessed at https://www.cdc.gov/drugoverdose/pdmp/states.html, 7 8, 2020.
7. Owen GT, Bruel BM, Schade CM et al. Evidence-based pain medicine for primary care physicians. Proc (Bayl Univ Med Cent). 2018;31(1):37–47. [PubMed: 29686550]
8. Botá SH. U.S. Opioid Epidemic: Impact on Public Health and Review of Prescription Drug Monitoring Programs (PDMPs). Online J Public Health Inform. 2019;11(2):e18. [PubMed: 31632612]
9. Delcher C, Pauly N, Moyo P. Advances in prescription drug monitoring program research: a literature synthesis (June 2018 to December 2019). Curr Opin Psychiatry. 2020;33(4):326–33. [PubMed: 32250984]
10. Sun BC, Lupulescu-Mann N, Charlesworth CJ et al. Variations in prescription drug monitoring program use by prescriber specialty. J Subst Abuse Treat 2018;9435–40.
11. Christianson H, Driscoll E, Hull A. Alaska nurse practitioners' barriers to use of prescription drug monitoring programs. J Am Assoc Nurse Pract. 2018;30(1):35–42. [PubMed: 29757920]

12. Radomski TR, Bixler FR, Zickmund SL et al. Physicians' Perspectives Regarding Prescription Drug Monitoring Program Use Within the Department of Veterans Affairs: a Multi-State Qualitative Study. J Gen Intern Med. 2018;33(8):1253–59. [PubMed: 29520747]
13. Hossain MA, Asamoah-Boaheng M, Badejo OA et al. Prescriber adherence to guidelines for chronic noncancer pain management with opioids: Systematic review and meta-analysis. Health Psychol 2020;39(5):430–51. [PubMed: 31999179]
14. Larson MJ, Browne C, Nikitin RV et al. Physicians report adopting safer opioid prescribing behaviors after academic detailing intervention. Subst Abus. 2018;39(2):218–24. [PubMed: 29608412]
15. Avorn J Academic Detailing: "Marketing" the Best Evidence to Clinicians. Jama. 2017;317(4):361–62. [PubMed: 28118458]
16. Fischer MA. Academic Detailing in Diabetes: Using Outreach Education to Improve the Quality of Care. Curr Diab Rep. 2016;16(10):98. [PubMed: 27586191]
17. May F, Simpson D, Hart L et al. Experience with academic detailing services for quality improvement in primary care practice. Qual Saf Health Care. 2009;18(3):225–31. [PubMed: 19468007]
18. Soumerai SB and Avorn J. Principles of educational outreach ('academic detailing') to improve clinical decision making. Jama. 1990;263(4):549–56. [PubMed: 2104640]
19. Bounthavong M, Lau MK, Popish SJ et al. Impact of academic detailing on benzodiazepine use among veterans with posttraumatic stress disorder. Subst Abus 2020;41(1):101–09. [PubMed: 30870137]
20. Bounthavong M, Harvey MA, Wells DL et al. Trends in naloxone prescriptions prescribed after implementation of a National Academic Detailing Service in the Veterans Health Administration: A preliminary analysis. J Am Pharm Assoc (2003). 2017;57(2s):S68–s72. [PubMed: 28089521]
21. Stevens J, Trimboli A, Samios P et al. A sustainable method to reduce postoperative oxycodone discharge prescribing in a metropolitan tertiary referral hospital. Anaesthesia. 2019;74(3):292–99. [PubMed: 30623418]
22. Hudmon KS, Corelli RL, de Moor C et al. Outcomes of a randomized trial evaluating two approaches for promoting pharmacy-based referrals to the tobacco quitline. Journal of the American Pharmacists Association. 2018;58(4):387–94. [PubMed: 29779983]
23. Desveaux L, Saragosa M, Rogers J et al. Improving the appropriateness of antipsychotic prescribing in nursing homes: a mixed-methods process evaluation of an academic detailing intervention. Implementation science : IS. 2017;12(1):71–71. [PubMed: 28549480]
24. May FW, Rowett DS, Gilbert AL et al. Outcomes of an educational-outreach service for community medical practitioners: non-steroidal anti-inflammatory drugs. Med J Aust. 1999;170(10):471–4. [PubMed: 10376022]
25. Gorin SS, Ashford AR, Lantigua R et al. Effectiveness of academic detailing on breast cancer screening among primary care physicians in an underserved community. J Am Board Fam Med. 2006;19(2):110–21. [PubMed: 16513899]
26. Dignan M, Shelton B, Slone SA et al. Effectiveness of a primary care practice intervention for increasing colorectal cancer screening in Appalachian Kentucky. Prev Med. 2014;5870–4.
27. Avorn J, Soumerai SB, Everitt DE et al. A randomized trial of a program to reduce the use of psychoactive drugs in nursing homes. N Engl J Med. 1992;327(3):168–73. [PubMed: 1608408]
28. Goldstein MG, Niaura R, Willey C et al. An academic detailing intervention to disseminate physician-delivered smoking cessation counseling: smoking cessation outcomes of the Physicians Counseling Smokers Project. Prev Med. 2003;36(2):185–96. [PubMed: 12590994]
29. Avorn J and Soumerai SB. Improving drug-therapy decisions through educational outreach. A randomized controlled trial of academically based "detailing". N Engl J Med. 1983;308(24):1457–63. [PubMed: 6406886]
30. Carboneau C Using diffusion of innovations and academic detailing to spread evidence-based practices. J Healthc Qual. 2005;27(2):48–52.
31. Sanson-Fisher RW. Diffusion of innovation theory for clinical change. Med J Aust. 2004;180(S6):S55–6. [PubMed: 15012582]

32. Harris AH, Bowe T, Hagedorn H et al. Multifaceted academic detailing program to increase pharmacotherapy for alcohol use disorder: interrupted time series evaluation of effectiveness. Addict Sci Clin Pract. 2016;11(1):15. [PubMed: 27633982]
33. Braddon J, Foot K, and Drug and Therapeutics Information Service. DATIS: drug & therapeutics information service. Daw Park, South Australia:Drug and Therapeutics Information Service; 2006. 220 p.
34. NaRCAD [Internet]. National Resource Center for Academic Detailing (NaRCAD). [cited 2021 Jan 28]. Available from: https://www.narcad.org/
35. Barth KS, Ball S, Adams RS et al. Development and Feasibility of an Academic Detailing Intervention to Improve Prescription Drug Monitoring Program Use Among Physicians. J Contin Educ Health Prof. 2017;37(2):98–105. [PubMed: 28562498]
36. Centers for Disease Control and Prevention. Prevention for States. Accessed at https://www.cdc.gov/drugoverdose/states/state_prevention.html, 7 8, 2020.
37. Fitzmaurice G, Laird N, Ware J. Applied Longitudinal Analysis. New York:John Wiley and Sons; 2004.
38. Payne EH, Hardin JW, Egede LE et al. Approaches for dealing with various sources of overdispersion in modeling count data: Scale adjustment versus modeling. Statistical methods in medical research. 2017;26(4):1802–23. [PubMed: 26031359]
39. Jaffa MA, Gebregziabher M, Luttrell DK et al. Multivariate generalized linear mixed models with random intercepts to analyze cardiovascular risk markers in type-1 diabetic patients. Journal of applied statistics. 2016;43(8):1447–64. [PubMed: 27829695]
40. Fink DS, Schleimer JP, Sarvet A et al. Association Between Prescription Drug Monitoring Programs and Nonfatal and Fatal Drug Overdoses: A Systematic Review. Ann Intern Med. 2018;168(11):783–90. [PubMed: 29801093]
41. Bachhuber MA, Saloner B, LaRochelle M et al. Physician Time Burden Associated with Querying Prescription Drug Monitoring Programs. Pain Med. 2018; 19(10): 1952–60. [PubMed: 29618105]
42. O'Brien MA, Rogers S, Jamtvedt G et al. Educational outreach visits: effects on professional practice and health care outcomes. Cochrane Database Syst Rev. 2007;2007(4):Cd000409.
43. Bloom BS. Effects of continuing medical education on improving physician clinical care and patient health: a review of systematic reviews. Int J Technol Assess Health Care. 2005;21(3):380–5. [PubMed: 16110718]
44. Behar E, Rowe C, Santos GM et al. Academic Detailing Pilot for Naloxone Prescribing Among Primary Care Providers in San Francisco. Fam Med. 2017;49(2):122–26. [PubMed: 28218937]
45. Abd-Elsayed A, Albert CA, Fischer M et al. Naloxone Academic Detailing: Role of Community Outreach Teaching. Curr Pain Headache Rep. 2018;22(11):72. [PubMed: 30151695]
46. Lasser KE, Shanahan C, Parker V et al. A Multicomponent Intervention to Improve Primary Care Provider Adherence to Chronic Opioid Therapy Guidelines and Reduce Opioid Misuse: A Cluster Randomized Controlled Trial Protocol. J Subst Abuse Treat. 2016;60101–9.
47. Liebschutz JM, Xuan Z, Shanahan CW et al. Improving Adherence to Long-term Opioid Therapy Guidelines to Reduce Opioid Misuse in Primary Care: A Cluster-Randomized Clinical Trial. JAMA Intern Med. 2017;177(9):1265–72. [PubMed: 28715535]
48. Quanbeck A, Brown RT, Zgierska AE et al. A randomized matched-pairs study of feasibility, acceptability, and effectiveness of systems consultation: a novel implementation strategy for adopting clinical guidelines for Opioid prescribing in primary care. Implement Sci. 2018;13(1):21. [PubMed: 29370813]
49. Alexandridis AA, McCort A, Ringwalt CL et al. A statewide evaluation of seven strategies to reduce opioid overdose in North Carolina. Inj Prev. 2018;24(1):48–54. [PubMed: 28835443]
50. Centers for Disease Control and Prevention. Prevent Opioid Use Disorder Accessed at https://www.cdc.gov/drugoverdose/prevention/opioid-use-disorder.html, 7 17, 2020.
51. Saffore CD, Pickard AS, Crawford SY et al. Practice change intentions after academic detailing align with subsequent opioid prescribing. J Am Pharm Assoc (2003). 2020. 60(6):1001–1008. [PubMed: 32891572]

Key Points

What Was Already Known

- Academic Detailing has demonstrated significant impact across a range of healthcare provider behavior.
- Academic Detailing can promote practice behavior changes that lead to safer opioid prescribing.

What This Study Adds

- This is one of the first studies to examine the impact of Academic Detailing on PDMP report requests specifically as a function of participants' baseline PDMP adoption status.
- The largest increases in PDMP report requests were demonstrated among "low/no prior report running" Late Adopters, while longer sustained increases in report requests were demonstrated by prescriber-authorized delegates of Early and Middle Adopting practices.
- The majority of increase in report requests were driven by practices that incorporated the use of prescriber-authorized delegates in the workflow.

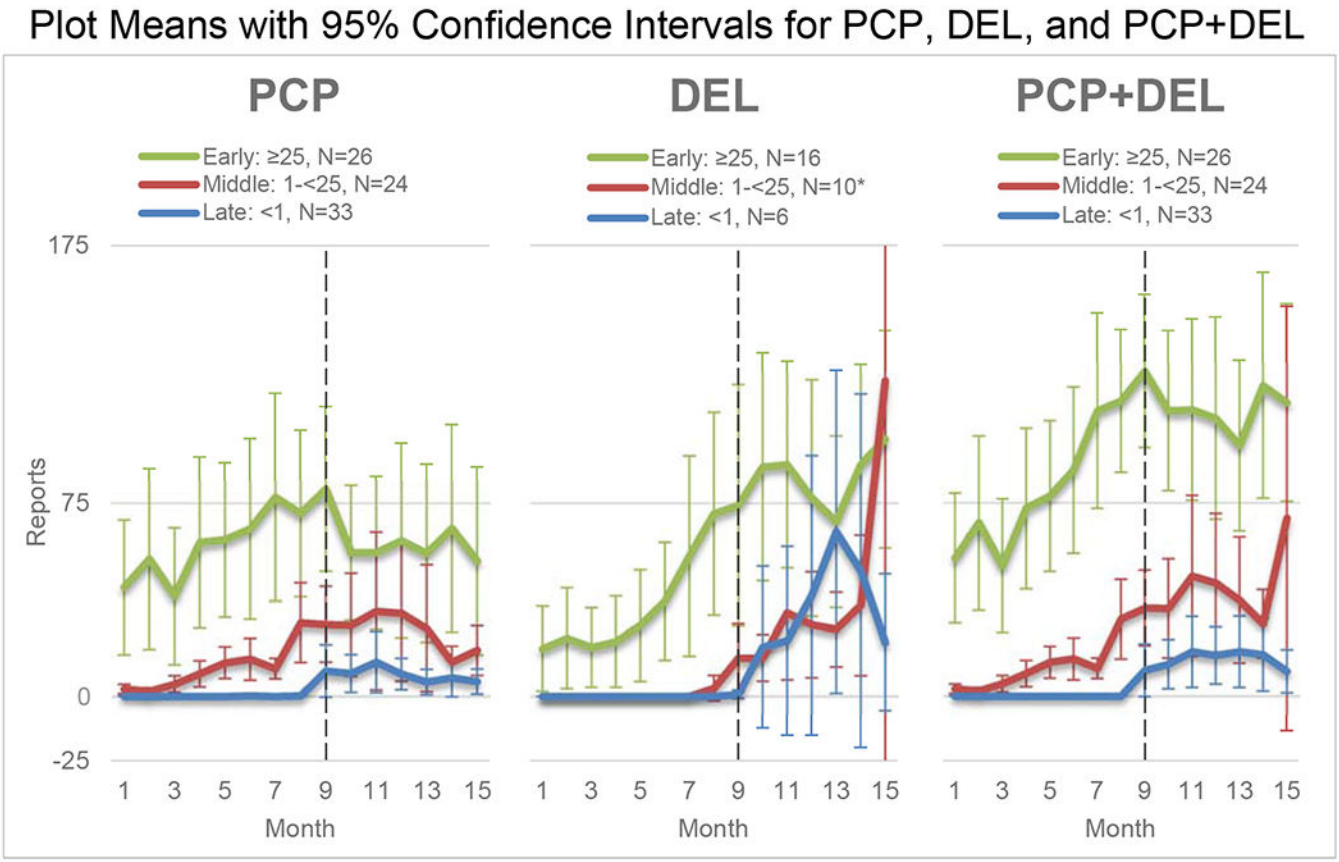

Figure 1.

Trajectory of monthly mean with 95% confidence intervals for PDMP report requests for Early Adopters (≥ 25), Middle Adopters (1 - < 25), and Late Adopters (< 1). Although AD visits occurred over an 8-month period, these data are aligned such that the AD intervention is represented in Month 9.

*Confidence Interval for DEL month 15 ranges from −90.3 to +335.5

PCP: Primary Care Prescriber

DEL: PDMP Delegate

PCP+DEL: Primary Care Prescriber and any associated PDMP Delegate(s)

Early Adopters: Monthly mean average of ≥ 25 report requests pre-intervention

Middle Adopters: Monthly mean average of 1 - < 25 report requests pre-intervention

Late Adopters: Monthly mean average of < 1 report requests pre-intervention

Table 1.

Prescriber characteristics in the pre- and post-intervention periods, including the monthly mean of report requests, dispensed opioid prescriptions, and patients dispensed an opioid.

	PCP Pre	PCP Post	DEL Pre	DEL Post	PCP+DEL Pre	PCP+DEL Post
Prescriber (N)	83	83	32	32	83	83
Reports						
Mean	21.5	29.9	17.1	60.0	28.1	53.0
Std Dev	40.8	52.0	30.7	58.8	44.1	67.7
Median	3.3	8.9	0.0	45.1	7.6	25.6
Range (Q1-Q3)	0.0-18.9	1.4-32.6	0-28.7	22.2-75.1	0.7-37.8	3.1-75.6
p-value for mean	0.0345		<0.0001		<0.0001	
Prescriptions						
Mean	57.0	54.5			57.0	54.5
Std Dev	74.6	77.5			74.6	77.5
Median	21.8	22.7			21.8	22.7
Range (Q1-Q3)	4.6-87.6	5.6-72.4			4.6-87.6	5.6-72.4
p-value for mean	0.4419				0.4419	
Patients						
Mean	46.6	45.2			46.6	45.2
Std Dev	57.9	58.2			57.9	58.2
Median	20.1	22.7			20.1	22.7
Range (Q1-Q3)	4.5-72.6	5.6-62.0			4.5-72.6	5.6-62.0
p-value for mean	0.5315				0.5315	

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Table 2.

Mean number of monthly report requests for pre- and post-intervention periods and their differences by PDMP adoption status.

Adoption Status	N	PCP			DEL†			PCP+DEL		
		Pre Ave	Post Ave	Ave Change	Pre Ave	Post Ave	Ave Change	Pre Ave	Post Ave	Ave Change
Early (≥25)	**26**	58.6	60.9	2.3	33.9	84.0	50.1*	79.5	112.6	33.1*
Middle (1 to <25)	**24**	10.7	25.6	14.9	0.4	39.1	38.7*	10.9	41.9	31.0*
Late (<1)	**33**	0.1	8.5	8.4*	0.0	30.6	30.6*	0.1	14.1	14.0*

*p<0.05

†16 Early Adopter PCPs, 10 Middle Adopter PCPs, and 6 Late Adopter PCPs had delegates (DEL).

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Late Adopters: Monthly mean average of < 1 report requests pre-intervention

Table 3.

Rate ratio (RR) and its corresponding Lower RR (LRR) and Upper RR (URR) 95% confidence interval (CI) for the association between count of monthly report requests and AD intervention among All, Early Adopters (≥ 25), Middle Adopters (1 - <25), and Late Adopters (<1). Post is the rate of requesting reports and Month*Post is the monthly rate of change in report requests post-AD intervention compared to pre-AD intervention.

Adoption Status	Variables	PCP+DEL				PCP			
		RR	LRR	URR	p-value	RR	LRR	URR	p-value
Overall	Month	1.33	1.27	1.38	<.0001	1.30	1.24	1.37	<.0001
	Post	40.35	15.13	107.60	<.0001	64.51	22.40	185.79	<.0001
	Month*Post	0.72	0.68	0.76	<.0001	0.67	0.62	0.72	<.0001
	Prescriptions	1.00	1.00	1.01	0.0002*	1.00	1.00	1.01	0.0006*
Early (≥ 25)	Month	1.22	1.17	1.27	<.0001	1.15	1.08	1.23	<.0001
	Post	4.98	2.34	10.64	<.0001	6.05	1.16	31.59	0.0332
	Month*Post	0.80	0.75	0.85	<.0001	0.77	0.70	0.85	<.0001
	Prescriptions	1.00	1.00	1.00	0.4303	1.00	1.00	1.00	0.8057
Middle (1 - < 25)	Month	1.49	1.38	1.60	<.0001	1.48	1.38	1.59	<.0001
	Post	29.41	8.99	96.25	<.0001	65.22	18.66	227.94	<.0001
	Month*Post	0.66	0.59	0.73	<.0001	0.58	0.52	0.65	<.0001
	Prescriptions	1.01	1.00	1.01	0.0518	1.01	1.00	1.01	0.1266
Late (< 1)	Month	1.13	0.94	1.36	0.206	1.13	0.93	1.37	0.2148
	Post	247.60	37.37	1640.08	<.0001	279.92	39.65	1976.34	<.0001
	Month*Post	0.79	0.64	0.98	0.0325	0.76	0.61	0.94	0.0135
	Prescriptions	1.01	1.00	1.01	0.0129*	1.01	1.00	1.01	0.053

*The RR for Prescriptions (dispensed opioids prescriptions) is very close to 1 (though p-values are significant due to small standard error) showing there is no association between number of reports and number of prescriptions.

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PCP: Primary Care Prescriber

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Late Adopters: Monthly mean average of < 1 report requests pre-intervention