

## ORIGINAL ARTICLE

# Adherence to opioid prescribing guidelines at an academic family medicine practice

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### ABSTRACT

**Introduction:** Opioid prescribing practices and guidelines are outlined by the United States Centers for Disease Control and Prevention (CDC), but limited data are currently available regarding their use in clinical practice. A primary care residency clinical site at an academic medical center attempted to improve compliance with the CDC best practices in 2022. As a quality improvement initiative, a policy was created, and education was provided to clinicians and patients. The clinical impact of these interventions was analyzed.

**Methods:** A retrospective chart review was performed for patients on chronic opiates during 2023. Extracted electronic health record data were analyzed to collect information on the prescriber (resident/faculty/advanced practice provider), opioid type and duration, concurrent benzodiazepine use, and mental health diagnoses. The main outcomes were whether these patients had an opioid agreement and/or urine drug screen (UDS) in the past 12 months.

**Results:** A total of 245 patients met the criteria, with 29 percent also being prescribed benzodiazepines, and 69 percent having at least one mental health diagnosis. Forty-one percent of the patients had a UDS in the electronic medical record in 2023, with the statistically significant predictors being nontramadol opioid use and a completed opioid agreement. Thirty-two percent had a completed opioid agreement, with the statistically significant predictors being a concomitant mental health diagnosis, provider type, and UDS obtained.

**Discussion/conclusion:** Despite policy and education, compliance with our primary outcomes remained low. Residents were the most compliant. Tramadol was also uniquely identified as having lower compliance with having a UDS on file. Next steps include continued education efforts on the risk and best practices for reducing opioid-related harms and structured chart reviews.

### INTRODUCTION

Chronic opioid use and associated opioid-related harms are common concerns in primary care.<sup>1</sup> In 2019, approximately 20 percent of the adult United States (US) population had chronic pain.<sup>2</sup> Primary care clinicians provide 45 percent of opioid prescriptions in the US,<sup>1</sup> and 33.6 percent of opioid prescriptions are filled for 30 days or longer.<sup>3</sup> Opioid risk mitigation strategies to address the clinic

management of patients on long-term opioid treatment include patient opioid agreements, toxicology testing also known as urine drug screens (UDSs), provider education, guideline implementation, naloxone availability, and state-wide prescription drug monitoring programs (PDMPs).<sup>4-7</sup>

Multiple guidelines recommend opioid agreements for patients on chronic opioids to reduce diversion or drug abuse (consensus statement, limited evidence).<sup>2,8,9</sup> A study conducted among

resident and attending physicians found that opioid agreements were obtained about 43 percent of the time.<sup>5</sup> Addressing opioid use and obtaining a signed agreement provides an opportunity to discuss risks, benefits, clinic guidelines, and structure around opioid prescribing.<sup>6,10,11</sup> A modest reduction in opioid misuse (7-23 percent) was found in a systematic review of four out of 11 studies with comparison groups that had treatment agreements, with or without UDS.<sup>12</sup> Additionally, among cancer survivors, a systematic review found that controlled substance agreements and periodic UDS testing can reduce controlled substance abuse and increase compliance.<sup>13</sup>

Results from a UDS allows providers to determine if patients are taking any other substances, prescribed or illicit, which might change the opioid-related risk profile or interfere with a therapeutic physician-patient relationship.<sup>2,14</sup> Compliance with obtaining a UDS annually was 26-52 percent in one cohort (n = 621,449) of long-term opioid users between 2012 and 2018.<sup>15</sup> There is mixed evidence that UDS can reduce drug abuse or diversion for opioids. One review of fair to poor evidence found modest reduction in opioid misuse.<sup>12</sup> An intervention including UDS showed a risk reduction that did not significantly change the rates of aberrant drug use results, suggesting that the utility of increased UDS for improving patient safety and preventing diversion remains uncertain.<sup>16</sup> For patients prescribed chronic opioids, obtaining a UDS at a regular interval (at least annually) is recommended (moderate-quality evidence).<sup>2,4,10</sup>

The use of PDMPs to review patient prescriptions is a key tool when prescribing chronic opioids (moderate-quality evidence).<sup>2</sup> A 2020 systematic review indicated that PDMP implementation was associated with reductions in opioid prescribing behaviors, opioid diversion, and opioid-related morbidity and substance use disorders.<sup>17</sup> Mandatory-access PDMPs has significantly reduced prescription drug abuse.<sup>18</sup> Comparing states with PDMPs to states without PDMPs reveal mitigated trends in opioid abuse.<sup>19</sup> For example, Florida's PDMP laws were associated with significant declines in opioid prescribing and use.<sup>20</sup> PDMPs are valuable in reducing prescription drug abuse, diversion, and understanding overdose risk.

Frequent follow-up visits are suggested for patients on chronic opioid medications (strong-quality evidence). For new prescriptions and medication changes, it is recommended that patients are

evaluated every 1-4 weeks. For patients on stable doses of chronic opioids, the US Centers for Disease Control and Prevention (CDC) recommended that patients be evaluated at least every 3 months.<sup>2</sup> The frequency of visits for patients on chronic opioids seen in primary care office visits is not well described in the literature.

Providers often treat concurrent mental health disorders among patients on chronic opioids.<sup>21,22</sup> Patients with depression and anxiety are at high risk for opioid-related harms.<sup>2</sup> A cross-sectional study of US adults in 2017 estimated that 16 percent of Americans with mental health diagnoses account for over half of the US population's prescribed opioids.<sup>21</sup> Other studies have correlated psychiatric diagnoses and an increased risk for opioid use disorder among various study populations.<sup>23-25</sup> The CDC recommends re-evaluation and increased monitoring in patients with depression and anxiety, along with optimizing treatment of these underlying conditions.<sup>2</sup> Previous evaluation of mental health diagnosis among our patients on chronic opioids revealed that 65 percent had at least one mental health diagnosis.<sup>26</sup> In addition, benzodiazepines increase the risk of overdose and death when prescribed alongside opioids. During January 2019-June 2020, benzodiazepines were involved in 16.8 percent of overdose deaths in the US, with opioids involved in 91.4 percent of those benzodiazepine deaths.<sup>27</sup> Benzodiazepine use with an opioid is a substantial risk for opioid-related harms.<sup>28,29</sup>

Tramadol has been a popular opioid for many prescribers, with low  $\mu$  opioid receptor activity and less regulatory schedule requirement. It was reclassified in 2014 as a Schedule IV controlled substance, with most other opioids having Schedule II or III controlled substances with a higher potential for abuse. In one survey, 87 percent of prescribers use tramadol, more than any other opioid.<sup>30</sup> Interestingly, tramadol after surgery is at least as likely as other opioids to be continued long-term (a marker for abuse), and there was a 250 percent increase in emergency room visits involving misuse or abuse of tramadol between 2005 and 2011.<sup>31</sup>

While all US states have passed legislation to expand access to naloxone, the dispensing of opioid prescriptions far outpaces those of naloxone nationally.<sup>32</sup> Naloxone is a lifesaving drug that requires a support person knowledgeable regarding administration.<sup>33</sup> Given that naloxone reduces the incidence of opioid-related deaths,<sup>10,34</sup> national

guidelines include offering and prescribing naloxone to patients on chronic opioid therapy.<sup>2</sup>

In the fall of 2022, providers in the Department of Family Medicine at an academic residency program standardized a process and agreed to obtain opioid agreements from patients on chronic opioid therapy, perform a yearly UDS, check the state registry PDMP for opioid prescriptions and refills, and schedule a primary care appointment at least every 3 months. These guidelines for practice were communicated via in-person meetings and e-mail to all providers. Patients with at least three-monthly prescriptions of opioids in the past year were mailed a letter regarding clinic guidelines and asked patients to see their primary care practitioner every 3 months, not get pain medications from other medical providers, undergo a UDS at least yearly, fill prescriptions at only one pharmacy, and not use illegal substances. Additionally, they were notified that our clinic policy does not allow filling of opioids on nights, on weekends, or out of state. The department also conducted multiple didactic sessions regarding safe opioid prescribing, opioid and benzodiazepine tapering, and harm reduction with naloxone, reaching an estimated 75 percent of faculty, 50 percent of advanced practice providers (APPs), and 96 percent of resident physicians during in-person sessions. All practitioners completed a chart review of their patients taking chronic opioid and benzodiazepine medications, including assessment of whether UDS and opioid agreements were completed.

The present study assesses adherence to the following clinic guidelines: obtain an opioid agreement documented in the electronic health record (EHR), obtain an annual UDS, and have a provider visit every 3 months. We are also interested in the characteristics of patients receiving chronic opioid prescriptions and which opioids were used, along with concomitant presence of psychiatric diagnoses, prescriptions for benzodiazepines, and if the patient had a naloxone prescription.

## **METHODS**

### **Study design**

Within an academic Department of Family and Community Medicine with an associated residency program, we conducted a retrospective chart review from January 1, 2023 to December 31, 2023. We extracted data from the patient's EHR. This study

was approved by the institution's institutional review board (IRB00109618).

### **Setting**

The academic residency program practice employs 30 family medicine residents, 44 faculty physicians, nine APPs, and two sports medicine fellows. The practice is in a suburban setting and has 21,019 individual patients with 46,472 visits in 2023.

### **Patients**

Patients included in this study were  $\geq 18$  years of age and on chronic opioid therapy, which is defined by having received at least three consecutive outpatient prescriptions for an oral opioid medication from a family medicine provider. We excluded patients who were not seen for the full 2023 calendar year (if they entered the practice during the year, transferred out of the practice, or were deceased) and those receiving chronic opioids prescribed by a provider outside of the department.

### **Variables and data collection**

Our primary outcomes were having an opioid agreement and having a UDS completed in the past 12 months. Using Clarity (Epicare, Verona, Wisconsin) relational database that serves as a repository for EHR data and is updated on a nightly basis, we extracted data for this quality improvement project from January 1, 2023 to December 31, 2023. In brief, 1,388 prescriptions written by a family medicine provider were identified for opioid medications, resulting in 347 unique charts. Eliminating for noncontinuous opioid prescriptions and patients who were not part of the practice for the entire calendar year resulted in 266 unique charts. Patient characteristics were evaluated from January 1, 2023 to December 31, 2023. We collected prescriber types including faculty clinician, APP or resident, along with the presence of UDS and/or opioid agreement. Two investigators assured that patients were prescribed opioid medications based on therapeutic class definitions of opioids. We defined chronic opioid therapy based on the CDC definition of "receipt of an opioid prescription for consecutive months."<sup>2</sup> Medications prescribed include codeine/acetaminophen, buprenorphine,

fentanyl, hydrocodone/acetaminophen, hydro-morphone, methadone, morphine, oxycodone/acetaminophen, oxycodone, oxycodone extended release, and tramadol. Roughly 55 percent of prescriptions were long-acting formulations, and about 7 percent of prescriptions were abuse-deterrent formulations. Single prescriptions for cough syrup and buprenorphine/naloxone for treatment of opioid use disorder were removed. The coprescribing of benzodiazepine medications was examined using the active medication list, which included prescriptions during the 2023 calendar year. Mental health diagnoses collected from the patient problem list included anxiety, depression, adjustment disorder, bipolar disorder, post-traumatic stress disorder (PTSD), or other psychiatric diagnoses. Four investigators took part in the chart review, with double verification of patient data extraction.

### Statistical methods

We carried out descriptive statistics for the whole sample and for the sample divided into the following: (1) those with an opioid agreement and (2) those with a UDS in 2023. Categorical data were evaluated using Pearson's Chi-square test. Continuous data were evaluated as means + SD using a *t*-test.

We deployed backward stepwise logistic regression to determine multivariate predictors of these primary outcomes. Given the small numbers for some of the psychiatric diagnoses, eg, PTSD and adjustment disorder, we combined all psychiatric diagnoses, creating a dichotomous variable "any psychiatric diagnosis" as a predictor variable. The provider type was grouped by residents, faculty, and APPs, with residents used as the reference category. Significance was based on the Wald statistic. For both descriptive and logistic regression analyses, statistical significance was set at  $p < 0.05$ . Data were collected using Microsoft Excel®, version 2016, then imported into IBM SPSS, version 27, for all analyses.

### RESULTS

The total number of patients with chronic opioid use in 2023 was 266. Twenty-one patients met exclusion criteria. Table 1 outlines the characteristics of the 245 patients prescribed opioids from within the department. Means and standard deviations of age and number of physician visits in 2023 within these groups are provided.

About one quarter of patients had been prescribed tramadol as their only opioid prescription (25.3 percent). The faculty made up 70.2 percent of prescribers, followed by residents (18.8 percent) and APPs (11 percent). A minority of patients had undergone a UDS in the past 12 months (40.8 percent) and/or had an opioid agreement in the EHR (32.2 percent).

Bivariate statistical analysis of patients' characteristics with an opioid agreement and/or a UDS are listed in the second and third columns, respectively, of Table 1, using a Chi square or analysis of variance analysis. Three characteristics were statistically significantly associated with having an opioid agreement in the EHR: having any psychiatric diagnosis (37.9 percent), type of provider who prescribed the opioid (resident prescribers with 65.2 percent of patients having an opioid agreement; APPs with 33.3 percent or patients having an opioid agreement; and faculty with 23.3 percent having an opioid agreement), and simultaneously having had a UDS within the past 12 months.

All of the following characteristics were associated with patients having an annual UDS via bivariate statistical analysis: having an anxiety disorder (51.2 percent); not having an adjustment disorder (0 percent); not being prescribed tramadol for their opioid (12.9 percent); being prescribed naloxone for opioid overdose prevention (55.2 percent); the type of prescribing provider (58.7 percent resident providers; 36 percent faculty providers; and 40.7 percent APPs); and having a timely UDS (64.6 percent).

Opioid agreements were found in 32.2 percent of patients' charts. There were three statistically significant predictors of having an opioid agreement in the EHR. First, having any psychiatric diagnosis conferred an odds ratio (OR) = 2.45 (95 percent confidence interval [CI] = 1.20-5.01) for the patient to have an opioid agreement. The provider type, the second significant predictor for having an opioid agreement, was categorical and compared APP and faculty to residents, the reference category. Compared to residents, the OR for APPs having an opioid agreement was 0.33 (95 percent CI = 0.11-0.97). Likewise, compared to residents, the OR for faculty having an opioid agreement was 0.18 (95 percent CI = 0.08-0.38). The third predictor of having an opioid agreement in the EHR was having had a UDS with an OR = 3.74 (95 percent CI = 2.04-6.85).

UDSs in the past year were obtained on 40.8 percent of patients receiving chronic opioid therapy.

**Table 1. Patient characteristics and outcomes**

| Characteristics of patients (N = 245) |                                       | Number (percent) or mean (SD) | Patients with  |   |
|---------------------------------------|---------------------------------------|-------------------------------|--|---|
|                                       |                                       |                               | Opioid agreement Number (percent)* or means (SD)† within the characteristics | Urine drug screen Number (percent)* or means (SD)† within the characteristics |
| Age, mean (SD)                        |                                       | 62.8 (12.1)                   | 62.3 (12.9)  | 61.3 (11.7)   |
| Assigned gender                       | Male (percent)                        | 87 (35.5)                     | 26 (29.9)  | 42 (48.3)   |
|                                       | Female (percent)                      | 158 (64.5)                    | 53 (33.5)  | 58 (36.7)   |
| Self-identified race or ethnicity     | White (percent)                       | 157 (64.1)                    | 51 (32.5)  | 69 (43.9)   |
|                                       | Black (percent)                       | 81 (33.1)                     | 27 (33.3)  | 28 (34.6)   |
|                                       | Hispanic (percent)                    | 2 (0.8)                       | 0 (0)  | 2 (100)   |
|                                       | Other (percent)                       | 10 (4.1)                      | 1 (10)   | 4 (40)  |
| Primary outcomes                      | Opioid agreement (percent)            | 79 (32.2)                     | NA   | 51 (64.6) <sup>¶</sup>  |
|                                       | Urine drug screen (percent)           | 100 (40.8)                    | 51 (51) <sup>¶</sup>   | NA  |
|                                       | Number of physician visits, mean (SD) | 5.2 (3.7)                     | 5.1 (3.1)  | 5.1 (3.2)   |
| Psychiatric comorbidity               | Any psychiatric diagnosis (percent)   | 169 (69)                      | 64 (37.9) <sup>  </sup>  | 75 (44.4)   |
|                                       | Depression (percent)                  | 123 (50.2)                    | 46 (37.4)  | 53 (43.2)   |
|                                       | Anxiety (percent)                     | 82 (33.5)                     | 36 (43.9)  | 42 (51.2) <sup>§</sup>  |
|                                       | Bipolar disorder (percent)            | 16 (6.5)                      | 6 (37.5)   | 6 (37.5)  |
|                                       | Adjustment disorder (percent)         | 8 (3.3)                       | 2 (25)   | 0 (0) <sup>§</sup>  |
|                                       | PTSD (percent)                        | 9 (3.7)                       | 6 (66.7)   | 6 (66.7)  |
|                                       | Other (percent)                       | 33 (13.5)                     | 10 (30.3)  | 100 (40.8)  |
| Opioid type                           | Tramadol (percent)                    | 62 (25.3)                     | 14 (22.6)  | 8 (12.9) <sup>¶</sup>   |
| Coprescriptions                       | Naloxone (percent)                    | 58 (23.7)                     | 24 (41.4)  | 32 (55.2) <sup>§</sup>  |
|                                       | Benzodiazepines (percent)             | 72 (29.4)                     | 21 (29.2)  | 35 (48.6)   |
| Provider type                         | APP <sup>‡</sup> (percent)            | 27 (11)                       | 9 (33.3) <sup>¶</sup>  | 11 (40.7) <sup>§</sup>  |
|                                       | Faculty (percent)                     | 172 (70.2)                    | 40 (23.3) <sup>¶</sup>   | 62 (36) <sup>§</sup>  |
|                                       | Residents (percent)                   | 46 (18.8)                     | 30 (65.2) <sup>¶</sup>   | 27 (58.7) <sup>§</sup>  |

SD: standard deviation; PTSD: post-traumatic stress disorder.  
 \*Statistical significance determined by Pearson's Chi square test for categories.  
 †Statistical significance determined by analysis of variance for means.  
 ‡APP: advanced practice providers (physician assistants or nurse practitioners).  
 §p < 0.05.  
 || p < 0.01.  
 ¶p < 0.001.

There are two statistically significant predictors of having a UDS. Having been prescribed the opioid tramadol conferred an OR = 0.15 (95 percent CI = 0.06-0.34). Having an opioid agreement in the EHR accorded an OR = 4.26 (95 percent CI = 2.32-7.81).

Mean number of physician visits for patients on chronic opioid therapy was  $5.2 \pm 3.7$  within the calendar year (Table 2). For all provider types, 4+ visits for patients occurred 59.4 percent of the time, and 0-1 visits occurred 10.6 percent of the time. Patients on chronic opioid therapy seen by residents had 4+ office visits during the year 85 percent of the time, and only 15 percent had 2-3 office visits in the year, with no patients of residents having 0-1 office visits. For APPs, 52 percent had 4+ office visits, 35 percent had 2-3 visits, and 13 percent had 0-1 visits. For faculty, the percentage of patients having 4+ office visits were 58 percent, 30 percent had 2-3 office visits, and 12 percent only having 0-1 office visits for the year.

Secondary outcomes included naloxone and benzodiazepine prescriptions. Naloxone was prescribed to patients on chronic opioids 23.7 percent of the time. Naloxone prescription was a positive predictor for obtaining a UDS ( $p < 0.05$ ). Benzodiazepine medications were prescribed concurrently with opioids 29.4 percent of the time. There were not statistically significant associations with obtaining UDS or having an opioid agreement in the EHR and coprescribing opioids and benzodiazepines.

## DISCUSSION

### Primary outcomes

This study uncovers predictors of having an opioid agreement in the EHR and of having a UDS in

the past 12 months. Patients having a UDS within the past 12 months had more than 3.5 times higher odds of having an opioid agreement. Looking from the perspective of likelihood of having a UDS in the EHR, patients with an opioid agreement had over four times greater odds of having a UDS compared to those without an opioid agreement. It is possible that having a UDS is a “keystone habit” that makes adherence to other parts of the clinic guidelines more likely. It may be that providers viewed this subset of patients as higher risk than patients taking other chronic opioid medications and thus more likely to document an opioid agreement and obtain a UDS. It may also be that practitioners who follow clinic guidelines in one area are more likely to follow guidelines in all areas, which were presented and taught in tandem. Finally, it may be that these patients were newer to the practice and completed the UDS and opioid agreement as part of an intake process.

Patients with any psychiatric diagnosis conferred about 2.5 times higher odds of having an opioid agreement. Practitioners may be more aware of opioid-related harms in this category and the possibility of alternative treatments for psychiatric disease and pain, therefore more likely to obtain an opioid agreement to document a risk–benefit discussion, disclose potential harms and alternative treatments to patients. Since substance use disorder is often comorbid with psychiatric diagnoses, it may also be that practitioners are more cognizant of potential for addiction and misuse in patients who have a psychiatric diagnosis on the chart and more likely to obtain an opioid agreement.

Patients with providers who were APPs or faculty members had 73 and 82 percent lower odds, respectively, of having an opioid agreement compared

**Table 2. Breakdown of number of patient office visits in 2023 per type of provider for all encounters**

| Type of encounter | Patients with 0-1 visits<br>(percent of visits by<br>provider type) | Patients with 2-3 visits<br>(percent of visits by<br>provider type) | Patients with 4+ visits<br>(percent of visits by<br>provider type) |
|-------------------|---|---|--|
| All encounters    | 26 (10.6)   | 72 (29.3)   | 147 (59.4)   |
| Resident          | 0 (0.0)   | 4 (15)  | 23 (85)  |
| APP               | 6 (13)  | 16 (35)   | 24 (52)  |
| Faculty           | 20 (12)   | 52 (30)   | 100 (58)   |

APP: advanced practice providers.

to patients with resident providers. Most of our educational interventions were aimed at resident physicians, though we did inform and do a chart review with faculty physicians as well. Most APPs at our practice site are not empaneled to patients but rather help with acute care and clinic overflow for all patients, so it may also be that they feel less obligation to have the risk–benefit conversation and document it in an opioid agreement or assume that the primary physician has already done this.

Regarding UDS, patients whose chronic opioid was tramadol had 85 percent lower odds of having a UDS compared to those prescribed different chronic opioids. It is possible that practitioners do not associate tramadol with opioid-related harms compared to other opioid medications and so do not obtain a UDS. An increase in education around tramadol and its risks are a planned intervention. It may also be that practitioners are not aware that tramadol fits under the clinic guideline definition of “chronic opioid use” with opioid receptor effects, and so did not obtain a UDS, as they were not aware of this expectation. Practitioners may also not be aware that tramadol is a separate toxicology order from the routine UDS for many clinic labs, ours included.

Frequency of monitoring visits for patients on chronic opioids by a primary care office has had little data previously published. Our overall percentage of patients meeting national guidelines of having at least four office visits in the past year was 59.4 percent. These visits were to a primary care practitioner in our office but were not verified to have discussed chronic pain or their opioid use, so it is possible that even 59.4 percent did not all have four office visits to monitor opioids. This was expected to be low as our guidelines came out early in the year when we started looking at data and so missing the first quarter of the year was likely. Also, patients were getting used to the new guidelines and did not receive our letter of expectations in the mail until February or March of the calendar year. Overall, 88.7 percent of the patients had at least two office visits over the course of the calendar year; 26 patients (10.6 percent) were seen infrequently (one visit or less per year); and all were empaneled to a faculty physician or an APP. Many patients were older and had travel limitations. Several patients had long-term relationships with their practitioner and were seeing specialists for debilitating conditions. Reminders and education on the benefit of

frequent monitoring will be continued, particularly to faculty and APPs.

### Secondary outcomes

Concurrent benzodiazepine use and chronic opioid use was seen 29.4 percent of the time. For reference, 33.5 percent of this population had a diagnosis of anxiety, and 69 percent had some psychiatric diagnosis, so we can infer that while not all patients with anxiety or psychiatric disorders were prescribed a benzodiazepine, it is a sizeable portion. Over the last 5 years, our clinic had several educational interventions with practitioners on the risks of coprescribing benzodiazepine medications together with opioids, including individual chart reviews, and have recommended naloxone prescribing if medications are used together. Naloxone was prescribed in 23.7 percent of all patients on chronic opioids. Increasing the number of patients receiving and having a support person who knows how to administer is a clinic goal that has previously been a focus that requires education with provider turnover.

Resident physicians received educational interventions over the process of rolling out guidelines, including an evidence-based 8-hour opioid use disorder training course and several didactic sessions on opioid harms and risk mitigation. Practice-wide, we shared lists of patients on chronic opioids for practitioners to perform chart reviews. In our review, residents were the closest to compliance with our clinic guidelines, being more likely to have an opioid agreement on the chart compared with faculty and APPs, and a trend toward higher compliance for UDS acquisition and having at least four visits in a calendar year, likely in part due to educational interventions. With educational interventions, we plan on building on the success we have seen with resident education and turn our focus to faculty and APP education.

### Limitations

There are limitations to this retrospective chart review. As a single center, its generalizability is limited. Patients had to have been seen for the entire year 2023 to be included. A potential lag time in uploading opioid agreements to the patient EHR may have underestimated the total numbers. A portion of patients without a UDS received tramadol that is not part of our laboratory’s standard urine drug monitoring.

## CONCLUSION

Our primary focus was to implement both clinical guidelines for our family medicine residency clinic and assess adherence to these guidelines to evaluate effectiveness and identify the next steps for interventions.

Residents were most compliant with seeing patients every 3 months and having an opioid agreement in the chart. Compliance with routine visits, obtaining a UDS, and having an opioid agreement on record are best practices for safe opioid prescribing and targets for future interventions. Next steps include continued education efforts on risk of opioid-related harms and best practices for reducing harm, including practitioner chart reviews to monitor compliance with best practices. Education specifically about tramadol risks and prescribing naloxone will be included in education sessions.

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