

BRIEF REPORT

Urine Drug Testing Among Patients Prescribed Long-Term Opioid Therapy: Patient and Clinician Factors

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Introduction: National guidelines recommend that patients with chronic noncancer pain prescribed long-term opioid therapy (LTOT) undergo periodic urine drug testing (UDT), yet UDT is performed inconsistently, and little evidence supports the utility of this approach. We examined patient and prescriber factors associated with UDT.

Methods: A 1-year retrospective cohort study of 5690 patients prescribed LTOT by 689 clinicians in a network of 13 primary care and specialty clinics. Negative binomial regression examined patient and prescriber factors associated with the number of tests completed, and logistic regression examined prescriber and practice level testing likelihood. Analyses were adjusted for patient and clinician characteristics and accounted for patient clustering within prescribers.

Results: A total of 2256 patients (39.6%) had UDT completed at least once. More UDT completion was associated with Black patient race and receipt of more opioid prescriptions, as well as with clinician testing compliance.

Conclusions: UDT was relatively infrequent in patients prescribed LTOT and associated with patient factors not known to confer greater opioid-related risk, such as race. In addition, there was significant clinician-driven variation in UDT. Given the uncertain clinical utility of such testing, these findings signal the need for strategies to address potential biases in the use of UDT. (J Am Board Fam Med 2023;36:537–541.)

Keywords: Chronic Pain, Logistic Regression, Medical Decision-Making, Opioids, Physician-Patient Relations, Retrospective Studies, Substance Abuse Testing, Urine Collection

Introduction

Recent guidelines intended to increase the safety of prescribing of opioids for chronic noncancer pain include recommendations for routine urine drug testing (UDT).^{1,2} Such testing is proposed to offer

an indication of appropriate medication use and potential misuse, and is now commonly considered as a quality of care metric for patients on long-term opioid therapy (LTOT).^{1–3} However, evidence to support the clinical utility of UDT in monitoring patients on LTOT is lacking.^{3–5}

Testing based on perceived aberrant behaviors alone has been shown to be ineffective, prone to clinician biases, and can result in decision making based on stereotypes.^{6–8} Routine periodic screening for potential opioid misuse—where patients on LTOT undergo UDT 1 to 3 or more times per year—is now recommended in national care guidelines with the aim of providing standardized and more equitable monitoring.³ However, wide variability remains in the application of UDT, with inconsistencies in which patients are targeted for testing and how test results are interpreted by clinicians.^{6,7}

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The variation in UDT practice can result in disparate outcomes among patients prescribed LTOT.⁸ Prior work found that Black patients are more likely than white patients to have UDT, despite evidence suggesting white males are more likely to misuse opioids.⁹ In addition, clinicians are more likely to discontinue LTOT for Black patients compared with white patients when UDT is positive for an illicit drug.¹⁰ Recognizing that testing is poorly standardized among clinicians,¹⁰ we sought to better understand the factors contributing to this variability by examining UDT in patients prescribed LTOT in a network of primary care and ambulatory specialty care offices.

Methods

This retrospective cohort study examined the electronic health records for 5690 patients without cancer prescribed LTOT between January 1, 2018, and December 31, 2018, across a large network of primary care offices and specialty clinics affiliated within an

academic health system in Northern California. Patients were included if they received 3 or more opioid prescriptions in any 90-day window, which is consistent with health system criteria for inclusion in an opioid therapy monitoring program for LTOT with recommendation for at least annual UDT. These patients would have a flagged “care gap” in their electronic chart for UDT, visible to all opioid prescribers in the health system. The University of California IRB determined this study was exempt from review.

Outcome

The outcomes of interest were patient completion of any UDT within the study year (yes/no) and number of UDT.

Covariates

We controlled for key patient factors including age, sex, self-reported race/ethnicity (white, Black, Asian, other), insurance (Medicaid or not), English language preferred (or not), number of opioid prescriptions in

Table 1. Characteristics of Patients Prescribed Long-Term Opioid Therapy, by Urine Drug Testing Status

	Total	No UDT	UDT	<i>p</i> -Value
N	5690	3474	2216	
Sex				0.78
Female	3520 (61.9%)	2154 (62.0%)	1366 (61.6%)	
Race				<0.001
White	4312 (75.8%)	2669 (76.8%)	1643 (74.1%)	
Black	559 (9.8%)	297 (8.5%)	262 (11.8%)	
Asian	154 (2.7%)	109 (3.1%)	45 (2.0%)	
Other	665 (11.7%)	399 (11.5%)	266 (12.0%)	
Age				<0.001
<30	130 (2.3%)	96 (2.8%)	34 (1.5%)	
30 to 49	1085 (19.1%)	650 (18.7%)	435 (19.6%)	
50 to 64	2260 (39.7%)	1332 (38.3%)	928 (41.9%)	
65 to 84	1993 (35.0%)	1232 (35.5%)	761 (34.3%)	
85+	222 (3.9%)	164 (4.7%)	58 (2.6%)	
Medicaid insurance	152 (2.7%)	118 (3.4%)	34 (1.5%)	<0.001
English speaking	5514 (96.9%)	3351 (96.5%)	2163 (97.6%)	0.015
No. opioid prescriptions, median (IQR)	7.0 (4.0, 12.0)	6.0 (4.0, 10.0)	11.0 (7.0, 14.0)	<0.001
Max. daily dose opioids, mean (SD)	83.6 (257.3)	75.6 (137.3)	96.0 (374.5)	0.004
No. office visits/year, median (IQR)	9.0 (5.0, 15.0)	9.0 (5.0, 15.0)	10.0 (6.0, 15.0)	0.14
Prescriber specialty				<0.001
Family Medicine	3289 (57.8%)	2004 (57.7%)	1285 (58.0%)	
Internal Medicine	1482 (26.0%)	727 (20.9%)	755 (34.1%)	
Specialist	919 (16.2%)	743 (21.4%)	176 (7.9%)	
Female prescriber	2871 (50.5%)	1709 (49.2%)	1162 (52.4%)	0.017

Notes: Sample represents 5690 individual patients within a large primary care network prescribed at least 3 months of opioid therapy. All data extracted from electronic medical record.

Abbreviations: UDT, urine drug test; Max daily dose, highest MME (morphine milliequivalent) per day during the study year; IQR, interquartile range; SD, standard deviation.

the study year, maximum daily average dose of prescribed opioids (MME, morphine milliequivalents) in the study year, and number of office visits in the study year. We also included available prescriber factors: Prescriber sex (male/female) and specialty type (Family Medicine, Internal Medicine, other specialty).

Statistical Analysis

Mixed models accounted for nesting of patients within prescribers as well as clinics. Negative binomial regression estimated the adjusted association between patient and prescriber factors and the number of tests patients completed during the study period. Logistic regression examined the adjusted prescriber and clinic intraclass correlation (ρ) to account for clinician and practice testing likelihood, respectively. All analyses were performed using Stata version 16.1 (StataCorp, College Station, TX).

Results

Our sample included 5690 patients prescribed at least 3 months of opioid therapy during the study period, of which 2216 completed at least 1 urine drug test. These patients were distributed over 689

prescribing clinicians, with each prescriber having approximately 8 patients in the sample (mean = 8.3 patients, range 1 to 147).

Unadjusted results revealed that, compared with patients who had no UDT during the study period, patients who had at least 1 test were disproportionately Black, less likely to be Asian, more likely to be age 30 to 49 or 50 to 64, not insured by Medicaid, and English-speaking. They had more opioid prescriptions and higher average opioid doses (MME). They were also more commonly seen by female and Internal Medicine prescribers (Table 1).

The negative binomial regression analysis revealed few adjusted patient-level factors significantly associated with testing: Black patients (vs white) had a higher rate of testing, whereas Asian patients (vs white) had a lower rate of testing. More testing was also associated with a higher number of opioid prescriptions. Other patient factors, including number of office visits and maximum daily dose, were not significantly associated with testing (Table 2).

Patients of internists, as compared with Family Physicians, were more likely to be tested, whereas patients prescribed opioids by other specialists were less likely to be tested. Patients of female prescribers

Table 2. Adjusted Association of Urine Drug Testing by Patient and Prescriber Factors

	aIRR (95% CI)	p-Value
Female sex (vs male)	0.9 (0.9,1.0)	0.21
Race (vs White)		
Black	1.2 (1.0,1.4)	0.01
Asian	0.7 (0.5,1.0)	0.04
Other	1.0 (0.8,1.2)	0.91
Age, years (vs <30)		
30 to 49	1.4 (1.0,2.0)	0.08
50 to 64	1.3 (0.9,1.9)	0.13
65 to 84	1.3 (0.9,1.8)	0.18
85+	0.8 (0.5,1.3)	0.42
Medicaid (vs other insurance)	1.0 (0.7,1.4)	0.9
English language preferred (vs non-English)	1.0 (0.7,1.4)	0.92
No. opioid prescriptions	1.1 (1.1,1.1)	<0.01
Max. daily dose opioids	1.0 (1.0,1.0)	0.94
No. office visits	1.0 (1.0,1.0)	0.27
Prescriber specialty (vs Family Medicine)		
Internal Medicine	1.6 (1.3,1.9)	<0.01
Specialist	0.6 (0.5,0.7)	<0.01
Female prescriber (vs male)	1.3 (1.0,1.5)	0.02

Notes: Negative binomial regression modeling the adjusted association between patient and prescriber factors and urine drug testing. Statistical significance set at $P < .05$.

Abbreviations: aIRR, adjusted incidence rate ratio; Max daily dose opioids, highest MME (morphine milliequivalent) per day during the study year; CI, confidence interval.

(compared with male) were more likely to be tested (Table 2). There was significant intraclass correlation (ICC) by prescriber ($\rho=0.27$, 95% confidence interval [CI]= 0.20–0.35); clinic ICC was also significant ($\rho=0.13$, [95% CI=0.06–0.24]).

Conclusions

Our analyses of patients prescribed long-term opioids for chronic pain suggest that urine drug testing is utilized inconsistently and scarcely based on use guidelines. Heterogeneity in urine drug testing within this sample population showed that certain patient factors were associated with testing. However, only the number of opioid prescriptions (an indication of duration of therapy) is plausibly connected with reason and opportunity for testing.

Prescriber factors were also associated with urine drug testing, with both sex and specialty being significantly correlated. The significant intraclass correlation in the fully adjusted multilevel model indicated that a patient's likelihood of being tested is associated with their prescriber's tendency to be in compliance with recommended testing. The clinician-level associations are notable given these data derive from a single health system with standardized practice guidelines at the time of the study. These findings highlight the marked variability in application of UDT, consistent with uncertain evidence of benefit.¹¹

In interpreting these results, we acknowledge key limitations. The data are from 1 year in a single health system and may not generalize to other care settings. Our cohort included all patients who met LTOT criteria during the study and may include some patients who were discontinued from therapy (and no longer indicated to have UDT). We measured completed (resulted) UDT at any time during the study year, but we were unable to determine if the test was ordered by the opioid prescriber or account for tests ordered and not completed.

These findings are consistent with those of other studies showing that urine drug testing in long-term opioid therapy is inconsistent with guidelines and that great variability exists in how the testing is applied, notably influenced by differences in clinician practice. Updated guidelines from the Centers for Disease Control and Prevention have modified the recommendation for UDT, advising clinicians to “consider the risks and benefits of toxicology testing,” (category B) and acknowledging a lack of

evidence of effectiveness of drug testing in LTOT risk mitigation.¹² Nevertheless, most health systems, professional societies, and other clinical guidelines continue to emphasize the role of UDT in opioid therapy.^{3,13,14} Testing in this study was driven at least in part by patient characteristics that are not associated with opioid-related risk, such as race. If regular drug testing continues to be recommended for patients prescribed LTOT, strategies must be developed to minimize the potential for bias in its application.

To see this article online, please go to: <http://jabfm.org/content/36/4/537.full>.

References

1. Dowell D, Haegerich TM, Chou R. CDC guideline for prescribing opioids for chronic pain—United States, 2016. *Jama* 2016;315:1624–45.
2. Manchikanti L, Kaye A, Knezevic NN, et al. Responsible, safe, and effective prescription of opioids for chronic non-cancer pain: American Society of Interventional Pain Physicians (ASIPP) Guidelines. *Pain Physician* 2017;20:S3–S92.
3. Argoff CE, Alford DP, Fudin J, et al. Rational urine drug monitoring in patients receiving opioids for chronic pain: consensus recommendations. *Pain Med* 2018;19:97–117.
4. Turner JA, Saunders K, Shortreed SM, et al. Chronic opioid therapy risk reduction initiative: impact on urine drug testing rates and results. *J Gen Intern Med* 2014;29:305–11.
5. Larochelle MR, Cruz R, Kosakowski S, et al. Do urine drug tests reveal substance misuse among patients prescribed opioids for chronic pain? *J Gen Intern Med* 2022;37:2365–72. Epub 2021 Aug 17.
6. Sherman KJ, Walker RL, Saunders K, et al. Doctor-patient trust among chronic pain patients on chronic opioid therapy after opioid risk reduction initiatives: a survey. *J Am Board Fam Med* 2018;31:578–87.
7. Katz NP, Sherburne S, Beach M, et al. Behavioral monitoring and urine toxicology testing in patients receiving long-term opioid therapy. *Anesth Analg* 2003;97:1097–102.
8. Becker WC, Starrels JL, Heo M, et al. Racial differences in primary care opioid risk reduction strategies. *Ann Fam Med* 2011;9:219–25.
9. Gaither JR, Gordon K, Crystal S, et al. Racial disparities in discontinuation of long-term opioid therapy following illicit drug use among black and white patients. *Drug Alcohol Depend* 2018;192:371–6.
10. Chua I, Petrides AK, Schiff GD, et al. Provider misinterpretation, documentation, and follow-up of

- definitive urine drug testing results. *J Gen Intern Med* 2020;35:283–90.
11. Eddy DM. Variations in physician practice: the role of uncertainty. *Health Aff (Millwood)* 1984;3:74–89.
12. Dowell D, Ragan KR, Jones CM, et al. CDC clinical practice guideline for prescribing opioids for pain—United States, 2022. *MMWR Recomm Rep* 2022;71:1–95.
13. VA/DoD Clinical Practice Guideline. (2022). Use of Opioids in the Management of Chronic Pain Work Group. Washington, DC: U.S. Government Printing Office.
14. NIDA. Improving opioid prescribing. National Institute on Drug Abuse. Available from: <https://nida.nih.gov/publications/improving-opioid-prescribing>. March 30, 2017. Accessed December 19, 2022.