

Letters

RESEARCH LETTER

Analysis of Drug Test Results Before and After the US Declaration of a National Emergency Concerning the COVID-19 Outbreak

The novel coronavirus disease 2019 (COVID-19) pandemic has exacerbated challenges for millions of adults with substance use disorders.¹ New obstacles for obtaining treatment exist as do increasing stressors, including isolation, unemployment, and illness.²

To better understand the pandemic's effects on drug use among those with or at risk of substance use disorders, we examined a convenience sample of urine drug test results.

Methods | The study protocol was approved by the Aspire independent review board and included a waiver of consent for the use of deidentified data. We conducted a cross-sectional

study of urine drug test results from patients diagnosed with or at risk of substance use disorders. The drug tests were ordered by health care professionals as part of a comprehensive treatment plan³ between November 14, 2019, and July 10, 2020.

Each specimen was derived from a unique adult patient. The analysis used definitive test results performed by liquid chromatography tandem mass spectrometry for cocaine, fentanyl, heroin, and methamphetamine. The patients who were reported to have been prescribed cocaine, fentanyl, or methamphetamine were excluded. A random sampling of 75 000 specimens were selected for both the period before COVID-19 (November 14, 2019, to March 12, 2020) and the period during COVID-19 (March 13, 2020, to July 10, 2020). The periods

were based on COVID-19 being declared a national emergency on March 13, 2020.

A 2-sample proportion test was used to determine if significant changes occurred in the demographic characteristics provided by the ordering clinician during the 2 periods (Wilcoxon test was used for patient age). Logistic regression was performed to evaluate the association of collection time and location (US Census region) with drug detection using an interaction term. Sex, age, and clinician specialty were added as potentially confounding covariates.

Adjusted odds ratios (ORs), Sidak-corrected 95% CIs, and Tukey-adjusted *P* values for each drug model were estimated. The adjusted ORs represent the drug detection odds for the population during COVID-19 compared with the population before COVID-19. R statistical software version 4.0.2 (R Project for Statistical Computing) was used for the data analysis. Statistical significance was set at *P* < .05 and all tests were 2-tailed.

Results | The total sample included urine drug test results for 150 000 patients. The patients tested for the selected drugs during the COVID-19 period were significantly younger vs the period before COVID-19 (median age, 46 years vs 49 years, respectively), were more often male (48.48% vs 46.06%), and were more likely from a substance use disorder treatment setting (30.84% vs 25.47%) (Table 1).

Compared with the period before COVID-19, the proportion of specimens testing positive during the COVID-19 period increased from 3.59% to 4.76% for cocaine (adjusted OR, 1.19 [95% CI, 1.11-1.29]; *P* < .001), from 3.80% to 7.32% for fentanyl (adjusted OR, 1.67 [95% CI, 1.55-1.81]; *P* < .001), from 1.29% to 2.09% for heroin (adjusted OR, 1.33 [95% CI, 1.11-1.61]; *P* = .002), and from 5.89% to 8.16% for methamphetamine (adjusted OR, 1.23 [95% CI, 1.14-1.32]; *P* < .001; Table 2).

Table 1. Characteristics of Urine Drug Test Specimens Tested Between November 14, 2019, and July 10, 2020

Characteristics	Specimens tested in population by COVID-19 pandemic status		<i>P</i> value ^a
	Before	During	
Unique patient specimens, No. (%)	75 000 (100.00)	75 000 (100.00)	
Sex, No. (%)			
Female	40 457 (53.94)	38 640 (51.52)	<.001
Male	34 543 (46.06)	36 360 (48.48)	<.001
Age, median (IQR), y	49 (23-75)	46 (20-72)	<.001 ^b
Age group, y			
18-24	3645 (4.86)	3795 (5.06)	.08
25-34	13 581 (18.11)	15 668 (20.89)	<.001
35-44	15 222 (20.30)	16 545 (22.06)	<.001
45-54	13 165 (17.55)	12 766 (17.02)	.01
55-64	15 548 (20.73)	14 298 (19.06)	<.001
≥65	13 839 (18.45)	11 928 (15.90)	<.001

(continued)

Table 1. Characteristics of Urine Drug Test Specimens Tested Between November 14, 2019, and July 10, 2020 (continued)

Characteristics	Specimens tested in population by COVID-19 pandemic status		P value ^a
	Before	During	
Specialty of the referring health care practice, No. (%)			
Behavioral health	10 657 (14.21)	7719 (10.29)	<.001
Multispecialty and other	5733 (7.64)	7246 (9.66)	<.001
Obstetrics and gynecology	449 (0.60)	791 (1.05)	<.001
Pain management	25 165 (33.55)	22 501 (30.00)	<.001
Primary care physician	13 897 (18.53)	13 611 (18.15)	.06
Substance use	19 099 (25.47)	23 132 (30.84)	<.001
US Census region, No. (%) ^c			
East North Central	16 357 (21.81)	16 658 (22.21)	.06
East South Central	7143 (9.52)	7500 (10.00)	.002
Mid-Atlantic	5438 (7.25)	4173 (5.56)	<.001
Mountain	12 531 (16.71)	13 985 (18.65)	<.001
New England	1520 (2.03)	963 (1.28)	<.001
Pacific	12 251 (16.33)	11 260 (15.01)	<.001
South Atlantic	11 429 (15.24)	11 672 (15.56)	.01
West North Central	3922 (5.23)	4564 (6.09)	<.001
West South Central	4409 (5.88)	4225 (5.63)	.04
Positive urine test results, No. (%)			
Cocaine	2695 (3.59)	3570 (4.76)	<.001
Fentanyl	2853 (3.80)	5492 (7.32)	<.001
Heroin	968 (1.29)	1570 (2.09)	<.001
Methamphetamine	4415 (5.89)	6118 (8.16)	<.001

Abbreviations: COVID-19, coronavirus disease 2019; IQR, interquartile range.

^a Unless otherwise indicated, the 2-sample proportion test was performed to determine if there were significant changes between the populations.

^b A Wilcoxon test was used to determine this P value.

^c The corresponding states for each US Census region appear in Table 2.

Table 2. Logistic Regression Analysis for Populations With Positive Test Results for Selected Drugs Before vs During the COVID-19 Pandemic

US Census region	Cocaine		Fentanyl		Heroin		Methamphetamine	
	Adjusted OR (95% CI) ^a	P value ^b	Adjusted OR (95% CI) ^a	P value ^b	Adjusted OR (95% CI) ^a	P value ^b	Adjusted OR (95% CI) ^a	P value ^b
East North Central ^c	1.31 (1.14-1.51)	<.001	1.93 (1.70-2.20)	<.001	1.59 (1.18-2.14)	<.001	1.34 (1.16-1.56)	<.001
East South Central ^d	1.20 (0.91-1.58)	.07	1.99 (1.62-2.45)	<.001	1.58 (1.01-2.48)	.04	1.26 (1.05-1.53)	.002
Mid-Atlantic ^e	1.40 (0.97-2.03)	.12	2.04 (1.22-3.39)	<.001	2.36 (0.71-7.81)	.53	1.42 (0.87-2.32)	.55
Mountain ^f	1.31 (0.92-1.86)	.42	1.65 (1.25-2.19)	<.001	1.50 (1.04-2.15)	.01	1.51 (1.25-1.82)	<.001
New England ^g	1.27 (0.71-2.27)	.99	1.86 (1.02-3.39)	.03	0.89 (0.10-8.00)	>.99	1.14 (0.52-2.51)	>.99
Pacific ^h	1.22 (0.85-1.77)	.90	1.68 (1.21-2.33)	<.001	1.44 (1.12-1.85)	<.001	1.18 (1.00-1.37)	.04
South Atlantic ⁱ	1.08 (0.84-1.38)	>.99	1.33 (1.00-1.77)	.06	0.63 (0.31-1.27)	.68	0.92 (0.68-1.24)	>.99
West North Central ^j	0.84 (0.49-1.42)	>.99	1.11 (0.77-1.62)	>.99	0.94 (0.49-1.81)	>.99	0.96 (0.74-1.25)	>.99
West South Central ^k	1.23 (0.73-2.06)	>.99	1.69 (0.87-3.30)	.34	1.99 (0.67-5.93)	.76	1.46 (1.02-2.08)	.03
Total	1.19 (1.11-1.29)	<.001	1.67 (1.55-1.81)	<.001	1.33 (1.11-1.61)	.002	1.23 (1.14-1.32)	<.001

Abbreviations: COVID-19, coronavirus disease 2019; OR, odds ratio.

^a The ORs reflect the odds of testing positive for any of the selected drugs before vs during the COVID-19 pandemic and the 95% CIs were estimated using the Sidak-corrected method.

^b The P values were corrected using the Tukey method.

^c Includes Illinois, Indiana, Michigan, Ohio, and Wisconsin.

^d Includes Alabama, Kentucky, Mississippi, and Tennessee.

^e Includes New Jersey, New York, and Pennsylvania.

^f Includes Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming.

^g Includes Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont.

^h Includes Alaska, California, Hawaii, Oregon, and Washington.

ⁱ Includes Delaware, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, District of Columbia, and West Virginia.

^j Includes Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, and South Dakota.

^k Includes Arkansas, Louisiana, Oklahoma, and Texas.

All US Census regions except the South Atlantic and West North Central saw significant increases in the adjusted OR for at least 1 drug. No US Census region saw a significant decrease in the adjusted OR.

Discussion | This study demonstrated that urine drug test positivity in a population diagnosed with or at risk of substance use disorders increased significantly for illicit cocaine, fentanyl, heroin, and methamphetamine from the 4 months before the

COVID-19 emergency declaration to the 4 months after the COVID-19 declaration.

This study has limitations. Individuals included in the analysis may have had incomplete or inaccurate medication lists that could result in inclusion of some patients with a prescribed substance. The study used a convenience sample, and variation in patient characteristics occurred after the COVID-19 emergency declaration. Although sex, age, and clinician specialty are associated with illicit drug positivity, they were accounted for in the regression model.

However, patients being tested during the pandemic may be at inherently higher risk and this self-selection could not be captured. Whether the increases reflect increases in new use or relapse are unknown. Differences in the pandemic or response at the state level could influence the results. The short time frame and dichotomized periods are limitations; fentanyl and methamphetamine use increased between 2012 and 2019 without an indication of seasonality.³

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Conflict of Interest Disclosures: Mr Wainwright and Dr Giroir reported the US Department of Health and Human Services (DHHS) has a data donation agreement with Millennium Health to receive near real-time drug test data to enhance efforts and target approaches in fighting the overdose crisis in the US. This donation is an effort to improve the work of the DHHS with state and local officials on drug trends in their areas and to target coordination of preventive health care resources to avoid overdoses. Mr Whitley and Drs Dawson, Huskey, and Lukowiak reported being employees of Millennium Health LLC. No other disclosures were reported.

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