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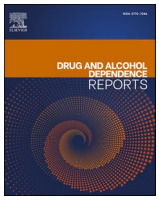

Fentanyl-positive urine drug screens in the emergency department: Association with intentional opioid misuse and racial disparities

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HIGHLIGHTS

- Patients with illicit fentanyl use or exposure are an at-risk cohort with notable ED recidivism and mortality.
- Black patients may be more likely to be unintentionally exposed to fentanyl.
- Disparities may exist in ED-based opioid misuse management.
- Targeted interventions are needed to address the evolving landscape of the opioid epidemic and reduce racial disparities.

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ABSTRACT

Background: An increase in opioid-related overdoses, notably from potent synthetic opioids like fentanyl, prompted this consideration of characteristics of emergency department (ED) patients with evidence for illicit fentanyl use or exposure, the correlation with intentional opioid misuse, and subsequent ED management.
Methods: A retrospective review was performed of patients presenting to an urban academic medical center ED with evidence for illicit fentanyl use, determined by positive urine drug screens (UDS), from 6/2021 through 11/2021. Participant demographics, comorbidities, ED chief complaint and disposition, and evidence of intentional opioid misuse were considered. Secondary outcomes included provision of buprenorphine/naloxone and/or naloxone kits at discharge, ED recidivism, and six-month mortality. Bivariate comparisons and logistic regression models were performed.
Results: Among 409 unique patients, most were white and male with a mean age of 39.4. Approximately half presented with opioid-related complaints. Evidence of intentional opioid misuse was identified in 72.6 % of patients. Black patients had 79 % lower odds of intentional opioid misuse compared to white patients. Regarding ED management, 28.8 % were discharged with buprenorphine/naloxone and 14.0 % with a naloxone kit. Black patients had 63 % lower odds of receiving buprenorphine/naloxone compared to white patients after controlling for covariates. Nearly 6 % of the study population died within six months of the initial ED visit.
Conclusion: This fentanyl-focused review describes patient characteristics which largely mirror the epidemiology of the current opioid epidemic; however, despite evidence of objective exposure, it also suggests that Black patients may be less likely to use fentanyl intentionally. It also highlights potential disparities related to ED-based opioid misuse patient management.

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1. Introduction

Opioid use is a growing contributor to mortality worldwide (World Health Organization, 2023). In the United States (US), the opioid epidemic continues to escalate, with the recent surge fueled by synthetic opioids like fentanyl (Dasgupta et al., 2018). Fentanyl is significantly more potent than other opioids, approximately 50–100 times more than morphine, leading to increased incidence of overdose and death (Jones et al., 2018; Kuczyńska et al., 2018). Since 2013, opioid-related deaths have increased drastically in the US, largely attributed to fatal synthetic opioid overdoses (CDC, 2023a).

Historically, the stereotypical demographics associated with opioid misuse and overdose have been white and male (Salmond and Allread, 2019). However, since 2013, with the rise of illicitly manufactured fentanyl, overdose deaths among Black individuals have grown at a faster rate than among White individuals (Furr-Holden et al., 2021). Illicit fentanyl is often mixed into other street drugs including heroin, cocaine, methamphetamine, and counterfeit opioid pills (Kuczyńska et al., 2018; Han et al., 2019). This has escalated the risks associated with opioid misuse and has created a need for improved harm reduction strategies and overdose management (Kuczyńska et al., 2018; Han et al., 2019).

In the emergency department (ED), urine drug screens (UDS) are often used to assess and manage various clinical presentations, to include acute intoxication or suspected substance misuse (Bahji et al., 2018). Amidst the current evolution of the opioid epidemic, there is a growing recognition of the need for UDS to include fentanyl detection (Larue et al., 2019). One study found that 56 % of patients who tested positive for fentanyl were negative for opiates on the standard UDS, highlighting the risk of missing fentanyl use or unintentional exposure without specific testing (Dezman et al., 2020).

The ED plays a critical role in managing patients with opioid misuse and opioid use disorder (OUD), offering critical interventions such as naloxone administration for stabilization in the setting of overdose and facilitating referrals to addiction treatment services (D'Onofrio et al., 2015). The role of ED clinicians has evolved in response to the opioid epidemic, with clinicians increasingly engaging in addiction treatment through initiatives like ED-initiated medications for opioid use disorder (MOUD), most notably buprenorphine/naloxone (D'Onofrio et al., 2015). ED-initiated MOUD has been shown to be feasible and successful (Thomas et al., 2022). Although disparities between patients with OUD and those receiving MOUD still exist, MOUD implementation in the ED has helped narrow this gap and make this treatment more accessible (Krawczyk et al., 2022; Coupet et al., 2021). However, there is little data on the effective management of patients in the ED impacted by illicit fentanyl use specifically, as detection of these events have not been as readily accessible prior to routine fentanyl testing inclusion in the UDS.

We sought to consider the characteristics of ED patients with a fentanyl-positive UDS, the correlation between documented intentional opioid misuse and objective fentanyl exposure, and subsequent management in the ED setting, with a particular focus on racial disparities. Better understanding of these factors is a critical step in devising targeted interventions to mitigate adverse outcomes associated with opioid misuse and promote more effective and equitable interventions in the ED setting.

2. Material and methods

2.1. Study design, population and setting

This is a retrospective review and analysis of patients who presented to the University of Alabama at Birmingham (UAB) ED with a fentanyl-positive UDS between June and November, 2021. UAB is an urban, academic medical center that serves as the main tertiary care facility for north-central Alabama and the surrounding areas. The UAB ED evaluates approximately 73,000 patients annually. We chose this time period for analysis as our institution began testing for fentanyl in the UDS in mid-May, 2021 in response to many suspected fentanyl overdoses. Patients with prescribed fentanyl, either while in the ED or on outpatient medication reconciliation, were excluded. Further, it is not uncommon for trauma alert patients to receive pre-hospital therapeutic fentanyl; we are unable currently to consistently reconcile these administrations therefore, the trauma alert cohort was also excluded from inclusion. Ethical approval for this study was obtained from the UAB Institutional Review Board.

2.2. Variables

Evidence for intentional opioid misuse was considered as a binary variable. Two individual reviewers performed a concomitant retrospective chart review to determine if evidence of intentional misuse was present in the documentation available in the electronic medical record (EMR) on the same date as the included UDS. Reviewers specifically considered free text content in the history of present illness, medical decision making, and diagnosis sections of the available EMR. Opioid misuse was defined as taking opioids in a way other than prescribed, potentially documented as opioid use disorder or addiction. Disagreements in determination of intentional misuse were resolved by a third reviewer with expertise in addiction medicine. Secondary outcomes included whether patients were discharged with a prescription for buprenorphine/naloxone (bup/nx) and whether patients were provided with a naloxone kit at discharge. Both secondary outcomes were binary variables coded as yes or no. Other outcomes considered included repeat ED or hospital utilization within 30 days and/or six months and death. There was no primary exposure of interest as this was an exploratory analysis that examined various sociodemographic and clinical characteristics as potential predictors of outcomes.

Sociodemographic characteristics included in this analysis were age, sex, race, housing status, and health insurance type. Age was examined as both a continuous variable measured in years and a categorical variable with four possible categories ($<$ 35 years, 35–44 years, 45–54 years, $\geq$ 55 years). Sex was a binary variable with male and female as possible options. Options for patient race include white, Black, and other. Health insurance type was defined as private, public (Medicaid or Medicare), and self-pay which included uninsured patients. For housing status, participants were classified as housed, incarcerated, or no permanent residence (experiencing homelessness).

Clinical characteristics included in this analysis were prior non-substance related mental health history (Diagnostic and Statistical Manual of Mental Illnesses 5th edition (DSM-5) diagnosis), mode of arrival to the ED, clinical outcome of initial ED visit, and concomitant drug use (per UDS). Mental health history was a binary yes or no. There were two possible modes of arrival: ambulance or ambulatory. Clinical outcome of ED visit was classified as discharged, admit to general hospital floor, admit to the intensive care unit (ICU), or admit to psychiatry. Concomitant drug use was evaluated per the UDS and included benzodiazepines, cannabis, cocaine, methamphetamine, other opioids, and heroin. Each drug was considered separately as a binary (yes or no) variable. Other drugs on the UDS were not mutually exclusive so percentages do not necessarily equate to 100. Evidence of intentional opioid misuse was also included as a predictor in the models evaluating whether or not patients were discharged with bup/nx and discharged with a naloxone kit.

2.3. Statistical analysis

All analyses were conducted in SAS 9.4 (Cary, NC, USA) with $p < 0.05$ being considered statistically significant. Frequencies and percentages were tabulated for categorical variables while mean and standard deviation were calculated for continuous variables. To assess for differences in categorical variables, we utilized chi-square or Fisher exact test. Fisher's exact test was used when cell sample size was less

than five. Student's t-test was used to examine differences in continuous age. To help identify correlates of our outcomes in the primary analysis, forward selection logistic regression models were also performed. Thresholds of $p < 0.2$ and $p < 0.1$ were used for entry and stay, respectively. Forward selection starts with an intercept only model, then adds predictor variables one-by-one, beginning with the most significant variable and keeps going until model fit is no longer improved or a pre-specified stopping criteria is met.

3. Results

During the six-month study period, a total of 2158 ED fentanyl-positive drug screens were completed, representing approximately five to six percent of all ED visits. Of these, 459 ED patient visits with a fentanyl-positive UDS, representing 409 unique patients, met inclusion criteria (Fig. 1). Of the duplicate patients, thirty patients presented to the ED two times and ten patients presented to the ED three times over the six-month study period. A majority of the patients included were male (63.3 %), white (69.1 %), and the mean age was 39.4 years (Table 1). Notably, 72.6 % of patients had evidence of intentional opioid misuse documented in their medical record, while 117 (28.8 %) patients were discharged with a bup/nx prescription, and 57 (14.0 %) were given a naloxone kit at discharge (Table 2). One hundred fourteen (27.9 %) patients and 195 (47.7 %) patients had repeat ED/hospital utilization within 30 days and six months, respectively. Twenty-four patients, nearly 6 % of the study population, died within six months of the initial ED visit (Table 1).

When comparing those with evidence of intentional opioid misuse to those without evidence of misuse in their medical record, patients with evidence of intentional misuse were younger (p=.0074), but there were no significant differences in terms of sex, housing status, or mental health history (Table 2). Black patients with fentanyl-positive UDS were less likely to have evidence suggesting intentional opioid misuse when compared to white patients ($p < 0.0001$). In the bivariate analysis, 48.0 % of Black patients had evidence of intentional opioid misuse compared to 83.3 % of white patients (Table 2). An additional exploratory logistic regression model also found that when compared to white patients, Black patients were 79 % less likely to have evidence of intentional opioid misuse (OR 0.21, $p < 0.0001$, Supplementary Table 1). There were also significant differences between those with and without evidence of intentional misuse in their medical record in terms of concomitant drug use. Patients without evidence of intentional opioid misuse were more likely to have evidence of concomitant cocaine use. Patients with evidence of intentional opioid misuse were more likely to have evidence of concomitant methamphetamine, heroin, and other opioid use (Table 2). Racial differences in concomitant substance use were also seen, with Black patients more likely to have evidence of concomitant cocaine use and white patients more likely to have evidence of concomitant meth, heroin, and other opioid use (Table 3). There was no statistically significant racial difference observed for concomitant cannabis or benzodiazepine use (Table 3).

When evaluating discharge provision of bup/nx, there were again no differences in terms of sex, housing status, or mental health history. Black patients were less likely to be discharged with bup/nx, with 9.0 % of Black patients given this prescription upon discharge compared to 37.7 % of white patients ($p < 0.0001$, Table 2). Additional analysis found Black patients were 63 % less likely to receive a bup/nx at

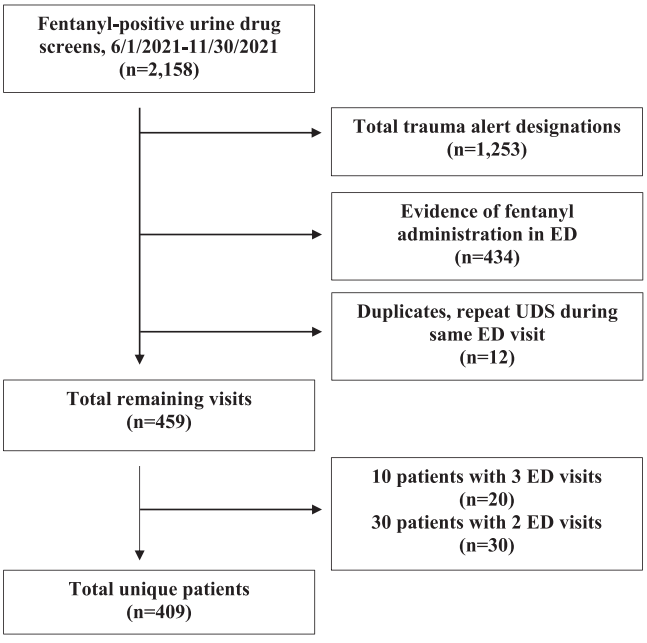

Fig. 1. Patient selection.Abbreviations: ED-Emergency Department, UDS-Urine Drug Screen.

Table 1
Emergency department fentanyl-positive urine drug screen patient characteristics.

Characteristics	Overall (n=409)
Age, mean (SD)	39.4 (11.1)
Age Group,n (%)	
< 35 years	154 (37.7)
35–44 years	144 (35.2)
45–54 years	69 (16.9)
55+ years	42 (10.3)
Sex,n (%)	
Female	150 (36.7)
Male	259 (63.3)
Race,n (%)	
White	275 (69.1)
Black	123 (30.0)
Health Insurance,n (%)	
Private	68 (16.6)
Public	137 (33.5)
Self-pay	204 (49.9)
Housing Status,n (%)	
Housed	347 (84.8)
Incarcerated	10 (2.4)
No Permanent Residence	52 (12.7)
Police Custody on arrival,n (%)	
No	365 (89.2)
Yes	44 (10.8)
Mental Health History,n (%)	
No	208 (50.9)
Yes	201 (49.1)
Mode of Arrival,n (%)	
Ambulance	162 (39.6)
Ambulatory	247 (60.4)
Presenting Chief Complaint,n (%)	
Opioid-related	208 (50.9)
Non-opioid substance related	15 (3.7)
Non-substance medical	77 (18.8)
Psychiatric	109 (26.7)
ED Visit Outcome,n (%)	
Discharge	159 (38.9)
Admit Floor	110 (26.9)
Admit ICU	28 (6.8)
Admit Psychiatry	112 (27.4)
Concomitant Drug Use,n (%)	
Benzodiazepines	74 (18.1)
Cannabis	178 (43.5)
Cocaine	144 (35.2)
Methamphetamines	208 (50.9)
Other opioids	237 (57.9)
Heroin	83 (20.3)
Repeat ED/Hospital Utilization within 30 days,n (%)	114 (27.9)
Repeat ED/Hospital Utilization within 6 months,n (%)	195 (47.7)
Death within 6 months of initial visit,n (%)	24 (5.9)

Table 2
Comparison of Emergency Department patients with fentanyl-positive urine drug screen by evidence of intentional opioid misuse documented in the medical record, buprenorphine/naloxone (bup/nx) prescription (Rx), and naloxone kit.

	Intentional Opioid Misuse			Discharged with Bup/Nx Rx			Discharged with Naloxone Kit		
	No (n=112)	Yes (n=297)	p-value[a]	No (n=289)	Yes (n=117)	p-value[a]	No (n=349)	Yes (n=57)	p-value[a]
Age,mean (SD)	42.2	38.4	**0.0074**	40.1	37.9	0.0555	39.7	38.0	0.2755
Age Group,n (%)									
< 35 years	36 (32.1)	118 (39.7)	**0.0004**	105 (36.3)	46 (39.3)	0.0864	126 (36.1)	25 (43.9)	0.4194
35–44 years	34 (30.4)	110 (37.0)		100 (34.6)	44 (37.6)		123 (35.2)	21 (36.8)	
45–54 years	19 (17.0)	50 (16.8)		47 (16.3)	22 (18.8)		61 (17.5)	8 (14.0)	
55+ years	23 (20.5)	19 (6.4)		37 (12.8)	5 (4.3)		39 (11.2)	3 (5.3)	
Sex,n (%)									
Female	42 (37.5)	108 (36.4)	0.8316	106 (36.7)	44 (37.6)	0.8606	131 (37.5)	19 (33.3)	0.5422
Male	70 (62.5)	189 (63.6)		183 (63.3)	73 (62.4)		218 (62.5)	38 (66.7)	
Race,n (%)									
White	46 (41.8)	229 (79.5)	**<0.0001**	170 (60.5)	103 (90.4)	**<0.0001**	238 (69.6)	35 (66.0)	0.6024
Black	64 (58.2)	59 (20.5)		111 (39.5)	11 (9.6)		104 (30.4)	18 (34.0)	
Health Insurance,n (%)									
Private	18 (16.1)	50 (16.8)	**0.0100**	45 (15.6)	23 (19.7)	**0.0132**	62 (17.8)	6 (10.5)	0.0987
Public	50 (44.6)	87 (29.3)		108 (37.4)	26 (22.2)		119 (34.1)	15 (26.3)	
Self-pay	44 (39.3)	160 (53.9)		136 (47.1)	68 (58.1)		168 (48.1)	36 (63.2)	
Housing Status,n (%)									
Housed	101 (90.2)	246 (82.8)	0.1155	244 (84.4)	100 (85.5)	0.1086	292 (83.7)	52 (91.2)	0.3865
Incarcerated	3 (2.7)	7 (2.4)		10 (3.5)	0 (0.0)		9 (2.6)	1 (1.8)	
No Permanent Residence	8 (7.1)	44 (14.8)		35 (12.1)	17 (14.5)		48 (13.87)	4 (7.0)	
Mental Health History,n (%)									
No	56 (50.0)	152 (51.2)	0.8317	152 (52.6)	54 (46.2)	0.2397	168 (48.1)	38 (66.7)	**0.0095**
Yes	56 (50.0)	145 (48.8)		137 (47.4)	63 (53.8)		181 (51.9)	19 (33.3)	
Mode of Arrival,n (%)									
Ambulance	63 (56.2)	99 (33.3)	**<0.0001**	127 (43.9)	33 (28.2)	**0.0033**	128 (36.7)	32 (56.1)	**0.0053**
Ambulatory	49 (43.8)	198 (66.7)		162 (56.1)	84 (71.8)		221 (63.3)	25 (43.9)	
ED Visit Outcome,n (%)									
Discharge	43 (38.4)	116 (39.1)	**0.0494**	123 (42.6)	36 (30.8)	**0.0108**	131 (37.5)	28 (49.1)	0.0957
Admit Floor	35 (31.2)	75 (25.2)		78 (27.0)	31 (26.5)		92 (26.4)	17 (29.8)	
Admit ICU	12 (10.7)	16 (5.4)		21 (7.3)	5 (4.3)		22 (6.3)	4 (7.0)	
Admit Psychiatry	22 (19.6)	90 (30.3)		67 (23.2)	45 (38.5)		104 (29.8)	8 (14.0)	
Concomitant Drug Use,n (%)									
Benzodiazepines	19 (17.0)	55 (18.5)	0.7158	55 (19.0)	19 (16.2)	0.5093	64 (18.3)	10 (17.5)	0.8855
Cannabis	55 (49.1)	123 (41.4)	0.1617	126 (43.6)	52 (44.4)	0.8764	161 (46.1)	17 (29.8)	**0.0214**
Cocaine	52 (46.4)	92 (31.0)	**0.0035**	117 (40.5)	26 (22.2)	**0.0005**	122 (35.0)	21 (36.8)	0.7824
Methamphetamines	44 (39.3)	164 (55.2)	**0.0041**	145 (50.2)	62 (53.0)	0.6069	179 (51.3)	28 (49.1)	0.7616
Other opioids	35 (31.2)	202 (68.0)	**<0.0001**	146 (50.5)	89 (76.1)	**<0.0001**	201 (57.6)	34 (59.6)	0.7707
Heroin	11 (9.8)	72 (24.2)	**0.0012**	48 (16.6)	35 (29.9)	**0.0026**	73 (20.9)	10 (17.5)	0.5582
Evidence of Intentional Opioid Misuse in EMR									
No	-	-	-	110 (38.1)	1 (0.8)	**<0.0001**	103 (29.5)	8 (14.0)	**0.0151**
Yes	-	-		179 (61.9)	116 (99.2)		246 (70.5)	49 (86.0)	

Notes: Race was missing for 11 patients; Naloxone kit and buprenorphine Rx missing for 3 patients.
Percentages are reported relative to column attribute
[a] P-values derived from t-test for continuous variables and chi-square or Fisher's exact for categorical variables. Boldface indicates statistical significance (p<0.05).

Table 3
Concomitant substance use by race.

Substance, n (%)	Total (n=447)	White (n=315)	Black (n=132)	p-value[a]
Benzodiazepines	82 (18.3)	56 (17.8)	26 (19.7)	0.63
Cannabis	184 (41.2)	121 (38.4)	63 (47.7)	0.068
Cocaine	152 (34.0)	77 (24.4)	75 (56.8)	**<0.0001**
Methamphetamines	230 (51.5)	183 (58.1)	47 (35.6)	**<0.0001**
Other opioids	266 (59.5)	209 (66.4)	57 (43.2)	**<0.0001**
Heroin	92 (20.6)	73 (23.2)	19 (14.4)	**0.036**

[a] Boldface indicates statistical significance (p<0.05) by Pearson chi-square test

discharge compared to white patients after controlling for covariates (OR 0.37, $p = 0.0094$) (Supplementary Table 1). Evidence of intentional misuse was highly correlated with being discharged with a bup/nx prescription. All but one patient who was discharged with a bup/nx prescription had evidence of intentional misuse in their medical record ($p < 0.0001$, Table 2).

When considering discharge provision of a naloxone kit, there were significant differences in terms of mental health history, mode of arrival at the ED, concomitant cannabis use, and evidence of intentional opioid misuse in the medical record (Table 2). Those without evidence of intentional opioid use were less likely to get a naloxone kit upon discharge (Table 2). This was additionally demonstrated in the logistic regression analysis, where patients with documented evidence of opioid misuse were 2.59 times more likely to receive a naloxone kit at discharge than those without evidence of misuse ($p = 0.0284$, Supplementary Table 1). There was no difference seen when comparing race and naloxone kit provision in bivariate analysis (Table 2) or in the logistic regression model (Supplementary Table 1).

4. Discussion

The locally high opioid and fentanyl-related deaths in the study area provided an ideal setting for this analysis. In the state of Alabama, there were 1408 reported overdose deaths in 2021; 1069 of these were attributed to fentanyl (CDC, 2023b; Alabama Operations Center, 2023). In Jefferson County alone, the most populous county in the state and the location of the UAB hospital, there were 316 fentanyl-related deaths in 2021, a 68 % increase from the prior year (Alabama Operations Center, 2023).

In this cohort of patients with fentanyl-positive UDS there was high overall incidence of ED recidivism, with over one quarter (27.9 %) returning within 30 days and nearly half (47.7 %) within six months of the initial ED visit. This suggests the possibility of significant unaddressed health and/or social issues, potentially related to OUD or other substance use disorders (SUD). Although specific reasons for the ED revisits were not delineated in this study, further investigation into this could guide future interventions to improve care for this at-risk population. Furthermore, the observed death rate in this cohort, approaching 6 %, is particularly notable. This is comparable to, and even slightly surpasses, a previously reported one-year mortality rate among patients following ED visit for non-fatal opioid overdose at 5.5 % (Weiner et al., 2020). While it's important to acknowledge this analysis doesn't prove causation and therefore the results should be interpreted with caution, the question remains: could a fentanyl-positive UDS serve as a harbinger of heightened death risk?

In this analysis, patients with fentanyl-positive UDS had a relatively high association with intentional opioid misuse, indicating a potential diagnostic link to opioid use disorder (OUD). While formal diagnosis of OUD is determined by DSM-5 criteria (Wakeman, 2020; Chartash et al., 2019), our findings raise intriguing possibilities regarding the role of the UDS as a potential screening tool for OUD within specific cohorts, particularly in the ED setting. Recent research has demonstrated promising validity when utilizing electronic health record review and a computed phenotype to assess likelihood of OUD among ED patients (Chartash et al., 2019). While it's important to note that intentional opioid misuse does not necessarily equate to an OUD diagnosis, it certainly serves as a risk factor (Webster, 2017). Therefore, leveraging UDS results to identify individuals engaging in intentional opioid misuse could serve as a valuable entry point for targeted interventions, including ED-initiated MOUD (Reuter et al., 2022).

We also found that Black patients with fentanyl-positive UDS were less likely to have objective evidence indicative of intentional opioid misuse when compared to white patients. Black patients were also more likely to have concomitant cocaine use. This observation may suggest a potential scenario wherein Black patients may be susceptible to unintentional fentanyl exposure, possibly via contamination while using other substances, specifically stimulants such as methamphetamines and cocaine (Ciccarone, 2021). A 2022 study conducted in Maryland found that 76 % of all fentanyl related overdose deaths included multiple substances (Park et al., 2022). Fentanyl contamination of the illicit drug supply has been well documented and extends well beyond opioids, resulting in significant implications for substance users who may have no intent of using opioids (United States Drug Enforcement Administration, 2024), in this instance, more commonly Black patients. However, we should also consider the evolving racial epidemiology of the opioid epidemic. While the stereotypical demographics associated with opioid misuse and overdose have been white and male (Salmond and Allread, 2019), since 2013, with the beginning of the illicitly manufactured fentanyl-dominated wave of the opioid epidemic, the growth in the overdose death rate among Black individuals has begun to outpace that of White individuals (Furr-Holden et al., 2021). It is important to consider how the contamination of other substances with illicit fentanyl has reshaped the racial landscape of opioid overdose deaths in the US. Our findings support that unintentional illicit fentanyl exposure disproportionately affects the Black population. Healthcare providers may be unaware of this recent demographic shift, leading to bias and reduced utilization of UDS screening and consequently resulting in discharge without appropriate harm reduction measures.

Further, when analyzing Black patients with evidence of intentional use, it appears they may be less likely to receive ED-initiated bup/nx, despite this becoming an increasingly more common approach in the ED management of OUD (Stewart et al., 2021). Racial disparities in access to MOUD must be considered, as there have been multiple studies that have demonstrated that Black individuals have lower access to MOUD (Andraka-Christou, 2021; Mark et al., 2023). One reason evident for this in our study may be due to more complex patterns of polysubstance misuse in Black patients. A previous cohort analysis found that white patients exhibited higher rates of isolated OUD while Black patients showed higher rates of OUD combined with other SUD rather than OUD alone (Lin et al., 2021). When patients present with polysubstance use rather than isolated OUD, ED clinicians may hesitate to initiate treatment with bup/nx given concerns regarding potential overdose risk or risk of misuse or diversion (Knudson et al., 2018). Furthermore, the intentional use in this study's sample may not equate to OUD as mentioned previously in this discussion, therefore not all patients with intentional use may be appropriate for ED-initiated MOUD. Considering the recent shift in the racial epidemiology of the opioid epidemic, we must acknowledge potential biases among clinicians due to their prior knowledge of the stereotypical patient with OUD as a young, white male (Hansen and Netherland, 2016). This lack of awareness of the changing demographics affected by the opioid epidemic may result in under-recognition of OUD in the Black cohort. Consequently, there may be a lack of treatment provision and referral contributing to increased disparities in care. Finally, in an exploratory bivariate analysis, we found that Black patients, compared to white patients, were more likely to present with chief complaint of an overdose as opposed to requesting substance rehabilitation and or detoxification. This difference in presentation to the ED may again suggest relative opioid naïveté or unintentional fentanyl exposure, as discussed earlier. However, it could also offer an alternative explanation for why Black patients were less likely to be discharged with bup/nx; they may not have been appropriate MOUD-initiation candidates at the time of the ED encounter.

Our results show 86 % of patients with evidence for intentional opioid misuse were provided with a naloxone kit at discharge. While this constitutes a majority of our patient sample, there remains an opportunity to improve consistent harm reduction strategies for all patients. This includes consideration of broader expansion of naloxone kit distribution including to patients with other substance use, which may put them as risk of unintentional fentanyl exposure. Implementing additional strategies to prevent overdose, such as fentanyl test strips (FTS), could offer an effective supplementary harm reduction approach to addressing the racial disparities identified in patients with illicit fentanyl exposure (Peiper et al., 2019). Recent distribution of FTS by ED clinicians was overall perceived positively, though additional training to incorporate FTS distribution into ED practice is warranted (Reed et al., 2023). Regardless of OUD status, the consideration of providing naloxone kits to broader patient groups and further exploration of integrating FTS in the ED could prove integral in addressing the racial disparities present in the illicit fentanyl exacerbation of the opioid epidemic within the US.

4.1. Limitations

This was a single-center review which may limit generalizability of findings to other settings. Our study population was restricted to patients who underwent UDS testing in the ED, potentially introducing selection bias. Patients who did not seek ED care or were managed without a UDS were not included, leading to a potential underrepresentation of certain demographics or clinical presentations. Also, while we included ED revisit and death as outcome variables of interest, the specific reason for ED revisit and cause of death were not delineated in this study. Therefore, we are unable to evaluate if these were opioid related. Finally, determining evidence of intentional opioid misuse relied of retrospective chart review which introduces the possibility of misclassification bias. The interpretation of documented evidence and reliance on EMR documentation may lead to misclassification of patient's true intentions. Authors attempted to minimize this potential bias by use of a two-screener system to make this determination. These screeners were in agreement for 87 % of the visits, with a third screener providing resolution in the remaining 13 % of cases.

5. Conclusions

This analysis sheds light on the characteristics and management of patients presenting to the ED with objective evidence of illicit fentanyl use or exposure. It highlights an at-risk cohort with notable ED recidivism and post-ED mortality. Further, while patient characteristics largely mirror local opioid epidemic epidemiology, findings also suggest that Black patients may be more likely to be unintentionally exposed to fentanyl and conversely, also potentially undertreated for opioid misuse/opioid use disorder when present. This underscores the need for targeted interventions to address the evolving landscape of the opioid epidemic and specifically, reduce racial disparities.

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CRediT authorship contribution statement

Landon McNellage: Writing – review & editing, Writing – original draft, Investigation. **James S Booth:** Writing – review & editing, Resources, Data curation. **Erin F Shufflebarger:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Formal analysis. **Lindy M Reynolds:** Writing – original draft, Methodology, Formal analysis. **Lauren A Walter:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Formal analysis, Conceptualization. **Li Li:** Writing – review & editing, Conceptualization. **Derek A Robinett:** Investigation. **Julie Brown:** Investigation. **Andrew R Edwards:** Investigation.

Declaration of Generative AI and AI-assisted technologies in the writing process

During the preparation of this work the author(s) used ChatGPT in order to improve readability and language. After using this tool/service, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the publication.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper

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Presentations

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Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.dadr.2024.100269.

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