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RESEARCH REPORT

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Association of Medicaid expansion with health insurance, unmet need for medical care and substance use disorder treatment among people who inject drugs in 13 US states

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Abstract

Background and Aims: Impoverished people who inject drugs (PWID) are at the epicenter of US drug-related epidemics. Medicaid expansion is designed to reduce cost-related barriers to care by expanding Medicaid coverage to all US adults living at or below 138% of the federal poverty line. This study aimed to measure whether Medicaid expansion is (1) positively associated with the probability that participants are currently insured; (2) inversely related to the probability of reporting unmet need for medical care due to cost in the past year; and (3) positively associated with the probability that they report receiving substance use disorder (SUD) treatment in the past year, among PWID subsisting at ≤ 138% of the federal poverty line.

Design: A two-way fixed-effects model was used to analyze serial cross-sectional observational data.

Setting: Seventeen metro areas in 13 US states took part in the study.

Participants: Participants were PWID who took part in any of the three waves (2012, 2015, 2018) of data gathered in the Center for Disease Control and Prevention's National HIV Behavioral Surveillance (NHBS), were aged ≤ 64 years and had incomes ≤ 138% of the federal poverty line. For SUD treatment analyses, the sample was further limited to PWID who used drugs daily, a proxy for SUD.

Measurements: State-level Medicaid expansion was measured using Kaiser Family Foundation data. Individual-level self-report measures were drawn from the NHBS surveys (e.g. health insurance coverage, unmet need for medical care because of its cost, SUD treatment program participation).

Findings: The sample for the insurance and unmet need analyses consisted of 19 946 impoverished PWID across 13 US states and 3 years. Approximately two-thirds were unhoused in the past year; 41.6% reported annual household incomes < $5000. In multivariable models, expansion was associated with a 19.0 [95% confidence interval (CI) = 9.0, 30.0] percentage-point increase in the probability of insurance coverage, and a 9.0 (95% CI = −15.0, −0.2) percentage-point reduction in the probability of unmet need. Expansion was unrelated to SUD treatment among PWID who used daily (n = 17 584).

Conclusions: US Medicaid expansion may curb drug-related epidemics among impoverished people who inject drugs by increasing health insurance coverage and reducing unmet need for care. Persisting non-financial barriers may undermine expansion's impact upon substance use disorder treatment in this sample.

KEYWORDS
Healthcare use, Medicaid expansion, National HIV Behavioral Surveillance, overdose, people who inject drugs, substance use disorder treatment

INTRODUCTION

Drug-related epidemics are among the defining health crises of the 21st-century United States. Overdose mortality rates surged more than five-fold between 2001 and 2021 [1–3], and overdoses combined with the COVID-19 pandemic to reduce life expectancy by 1.5 years in 2020 [4]. The number of newly diagnosed cases of acute infection with hepatitis C virus (HCV), a virus often spread via injection drug use, rose almost four-fold between 2011 and 2020 [5, 6]. Because injection drug use and poverty dramatically elevate physiological and social vulnerability to overdose and to blood-borne viral transmission [7–12], impoverished people who inject drugs (PWID) are at the epicenter of these crises.

Medicaid expansion is a pillar of the Patient Protection and Affordable Care Act (ACA) that can help to end drug-related crises [13]. Medicaid expansion is designed to reduce cost-related barriers to care by expanding Medicaid coverage to all adults living at or below 138% of the federal poverty line [14, 15]. Medicaid Expansion's impacts upon the general population are well documented. Health insurance coverage among working-age adults increased 7–17 percentage points more in states that expanded Medicaid versus those that did not [14, 16]. Perhaps, as a result, Medicaid expansion is associated with greater preventive health-care use and reduced unmet need for medical care in the general population [17–21].

Parallel research on the effects of Medicaid expansion ('Expansion') on key outcomes among people who use drugs—but do not necessarily inject them—is still emerging. Several studies have found that Medicaid expansion has led to significant gains in Medicaid coverage and reductions in the percentage who are uninsured among those who use drugs [22–25]. An analysis of National Survey on Drug Use and Health (NSUDH) data, for example, found that Medicaid coverage was 14 percentage points higher pre- versus post-Expansion among impoverished people with heroin use disorder [23]. Findings on the association between Expansion and treatment for substance use disorders (SUD) are more mixed [26–33]. In an analysis of national survey data, for example, Olfson *et al.* found no association between Expansion and the receipt of SUD treatment in the past year among people living with an SUD [28]. However, studies analyzing data from SUD treatment programs, administrative claims and other sources suggest that Expansion is associated with increased SUD treatment participation among people in need [26, 27, 29–33]. In an analysis of SUD treatment data, for example, Saloner *et al.* found that admissions increased by one-third 4 years post-Expansion in Expansion states [27]. Evidence is sparse regarding the impact of Expansion on unmet need for medical care among people who use drugs.

The possible impacts of Expansion on insurance coverage, SUD treatment and health-care use have been neglected among PWID. Findings gleaned from the broader population of impoverished people who use drugs may not be germane to this vulnerable population: PWID have higher rates of incarceration [34, 35], and individuals incarcerated for > 1 month are disenrolled from Medicaid. Lewis *et al.*'s cross-sectional analysis of the Center for Disease Control and Prevention's (CDC's) 2018 National HIV Behavioral Surveillance (NHBS) data provides a notable exception: they found that PWID living in US states that expanded Medicaid were more likely to report having health insurance, to have visited a health-care provider in the past year and to have received SUD treatment in the past 12 months [36]. To the best of our knowledge, this single cross-sectional paper constitutes the sole analysis of Expansion's relationships to these essential outcomes among PWID.

Analyzing Expansion's impacts upon health service outcomes among impoverished PWID—a population at the center of US drug-related epidemics—is exceptionally challenging. Robust econometric models require data on large samples of impoverished PWID in multiple states that have and have not expanded Medicaid over time. Studies, however, rarely have sufficient resources to generate such samples at this scale. Large administrative databases (e.g. electronic medical records) may cover multiple states over time, but rarely permit valid ascertainment of injection drug use or key confounders.

NHBS provides an unprecedented opportunity to rigorously examine associations of Expansion to health insurance coverage and health service use among impoverished PWID. Created to monitor HIV-related behavioral risk and protective factors, every 3 years NHBS surveys hundreds of PWID in each of ≥ 20 US metropolitan statistical areas (MSAs) that have high HIV prevalence [37]. The present analysis leverages NHBS's temporal (2012, 2015, 2018) and geographic (13 US states) scope and large sample of impoverished PWID (n = 19 946) to test hypotheses that Expansion is (1) positively associated with the probability that participants are currently insured; (2) inversely related to the probability of reporting unmet need for medical care due to cost in the past year; and (3) positively associated with the probability that they report receiving SUD treatment in the past year, among PWID subsisting at ≤ 138% of the federal poverty line.

METHODS

Overview, units of analysis and sample

We applied two-way, fixed-effect (state and year) difference-in-difference (DiD) models to test these hypotheses using serial cross-sectional data from NHBS and other existing administrative data. We have two units of analysis: state, the geopolitical unit at which Expansion is enacted and implemented, and individual PWID.

States

We included a balanced sample of US MSAs and states where NHBS interviewed PWID in the 2012, 2015 and 2018 cycles. We then excluded two states that had expanded Medicaid via Section 1115 before June 2011, the start of our study period, because 1115 did not uniformly cover behavioral health-care [38]. Thirteen states met these criteria. These states were home to a median of 476 PWID interviewed in 2012 (range = 162, 1227), 455 PWID in 2015 (range = 294, 1301) and 419 PWID in 2018 (range = 249, 1000).

Individual PWID

Data on individuals were drawn from NHBS's three most recent PWID cycles (2012, 2015, 2018). NHBS used respondent-driven sampling (RDS) to recruit approximately 500 PWID from each of 20 MSAs in 2012 and 2015 and from each of 23 MSAs in 2018; 2018 is the most recent year of NHBS PWID data available to us: the CDC deferred scheduled 2021 data collection until 2022 because of the COVID-19 pandemic. NHBS participant eligibility criteria for PWID include (1) injecting a non-prescribed drug in the past 12 months; (2) being aged ≥ 18; (3) living in one of the MSAs of interest; and (4) having capacity to complete the survey in English or Spanish. Additional information on NHBS eligibility and sampling is available elsewhere [39, 40]. We further limited the analytical sample to (1) PWID who lived in a state that met the eligibility criteria described above; and (2) PWID who had incomes ≤ 138% of the federal poverty line (81% of PWID interviewed in 2012, 2015 and 2018), and might thus be eligible for Medicaid. We excluded (1) participants aged > 65 years, as they may be covered by Medicare; (2) PWID from the San Juan-Bayamon MSA, because of differences between Puerto Rico's Medicaid program and those of the US states; and (3) participants with incomplete data on analytical variables (< 3%; n = 561). The final analytical sample included 19 946 PWID living in 17 MSAs in 13 states.

We sought to further limit SUD treatment analyses to PWID with an SUD. NHBS, however, does not query SUD. We used daily use of any non-prescribed drug queried by NHBS, aside from alcohol, as a proxy for SUD. This created a sample of n = 17 584 (88% of the sample) PWID for SUD treatment models.

Measures

Outcomes

We examined the association between Expansion and each of three outcomes: self-reported (1) health insurance coverage; (2) unmet need for medical care because of its cost in the past 12 months; and (3) participation in an SUD treatment program in the past 12 months. These outcomes were dichotomous variables drawn from NHBS and were based on the following questions: 'Do you currently have health insurance or health care coverage?'; 'During the past 12 months was there a time when you needed medical care but didn't get it because you couldn't afford it?'; and 'Have you participated in a program to treat drug use in the past 12 months?'. The health insurance item offered a range of possible types of insurance coverage as well as uninsured. We dichotomized answer choices to any insurance versus uninsured.

Primary independent variable: time-varying state Expansion

We measured Expansion using a time-varying state-level dichotomous indicator, created using Kaiser Family Foundation data [41]. Because NHBS data collection spans June–December in each cycle and because two of our outcomes (unmet need and SUD treatment) have year-long recall periods, we used June in the year preceding NHBS data collection to classify each state's Expansion status for each cycle. No states expanded before June 2011 (the start of the 2012 look-back period). Eight states expanded by June 2014 (the start of the 2015 look-back period); two additional states expanded by June 2017 (the start of the 2018 look-back period). Three states had not expanded Medicaid by the close of the study period. See Supporting information, Table S1 for a list of states and Medicaid timing.

Individual-level covariates

We operationalized the following individual-level covariates using NHBS data: socio-demographic characteristics (e.g. age, gender, race/ethnicity), history of incarceration (i.e. held in a detention center, jail or prison > 24 hours in past 12 months), duration of injection drug use and employment (i.e. employed, unable to work due to health, not employed/other).

Analysis

We analyzed the associations of the time-varying dichotomous indicator of state Expansion (as of the recall period for NHBS cycle) to each outcome among PWID using two-way (state and year) fixed-effect DiD modelling [42]. Including state and year fixed effects (in unadjusted and adjusted models) allowed us to distinguish the

possible impact of Expansion from confounding state heterogeneity and the common secular trend. We used linear probability models; when we tested models using a logit for the dichotomous outcome, conclusions were unchanged. Due to the small number of states (n = 13) in our analysis, we estimated confidence intervals (CIs) and P-values with the wild cluster bootstrap implemented method using Stata's boot-test package [43].

To test the DiD assumption that the exposure of interest (i.e. Expansion) is not associated with changes in sample composition over time, we followed guidance by Pei *et al.* [44] and tested the relationships between Expansion and MSA-level NHBS PWID sample composition over time using balance tests. Compositional characteristics of interest were the percentages of NHBS PWID who were male, BIPOC/Latinx, living at or below the federal poverty line, high-school graduates/general educational development (GED), employed, incarcerated, unhoused and the mean injected duration (see Supporting information, Table S2). We wild cluster bootstrapped CIs and a priori set the practical level of significance to $P \leq 0.15$. We found evidence of a relationship between Medicaid and percentage incarcerated (P = 0.03) and adjusted models for this MSA-level covariate.

We were unable to test DiD's parallel trends assumptions in pre-Expansion years because outcome variables within the NHBS database were unavailable for prior years (e.g. unmet need was not captured by NHBS prior to 2012; NHBS measures of SUD treatment changed substantively over time). No alternative databases exist to test these assumptions among PWID.

We explored distributions of all variables and examined correlations. Age and number of years since first injection were highly correlated (r = 0.74), so we eliminated age from models. Note that analyses were not pre-registered; results should thus be considered exploratory. Statistical analyses were carried out with Stata version 15.1.

Ethics

Analyses were approved by the Emory University Institutional Review Board. Activities for NHBS were approved by the Centers for Disease Control and Prevention and by applicable local institutional review boards in each participating city [45, 46].

RESULTS

Sample description

The analytical sample for the health insurance and unmet need analyses included 19 946 impoverished PWID residing in 13 US states. PWID were deeply impoverished: 41.6% reported an annual household income < $5000, and 65.2% were unhoused in the past 12 months (Table 1). Approximately one-third (36.6%) were non-Hispanic White, 40% were non-Hispanic Black and 21.7% were Hispanic/Latinx.

Table 1 presents NHBS participant characteristics comparing states that expanded versus did not expand Medicaid during the study period. Insurance coverage increased 23.2 percentage points in Expansion states between 2012 and 2018, from 63.9 to 87.1%, and was relatively unchanged in non-Expansion states during these same years, shifting from 38.7 to 37.2% (Figure 1). Unmet need for medical care due to its cost decreased 10.1 percentage points in Expansion states between 2012 and 2018, from 31.8 to 21.6%, and decreased 3.7 percentage points in non-Expansion states, from 40.2 to 36.4%.

The analytical sample for the SUD treatment analysis included 17 584 impoverished PWID in these same 13 states who used drugs daily (Table 2). In Expansion states, the percentage of PWID who took part in SUD treatment increased 9.1 percentage points, from 37.3 to 46.4%, and increased 8.1 percentage points in non-Expansion states, from 21.2 to 29.3%.

Model-based analysis

In the unadjusted model (Table 3), Expansion was associated with a 21.0 percentage-point increase in the probability of health insurance coverage (95% CI = 12.0, 29.0, covariates listed in Table 3). This relationship persisted in the adjusted model that controlled for individual-level covariates and MSA-level percentage incarcerated (19.0 percentage points; 95% CI = 9.0, 30.0).

In the unadjusted model, time-varying Expansion was not associated with unmet need for care (P = 0.08). In the multivariable model, however, Medicaid was associated with a 9.0 percentage-point decrease in the probability of unmet need for care (9.0 percentage points; 95% CI = −15.0, −0.2).

In the sample of PWID who used daily, Expansion was not associated with the probability of past-year SUD treatment in unadjusted or adjusted models (unadjusted model, P = 0.23; adjusted model P = 0.19).

To preliminarily explore whether health insurance might mediate the relationship between Expansion and unmet need for care, we added health insurance into the multivariable model using wild cluster bootstrapping. The magnitude of the association between Expansion and this outcome diminished from −9.0 to −4.0, and lost significance (95% CI = −11.0, 5.0, P = 0.27).

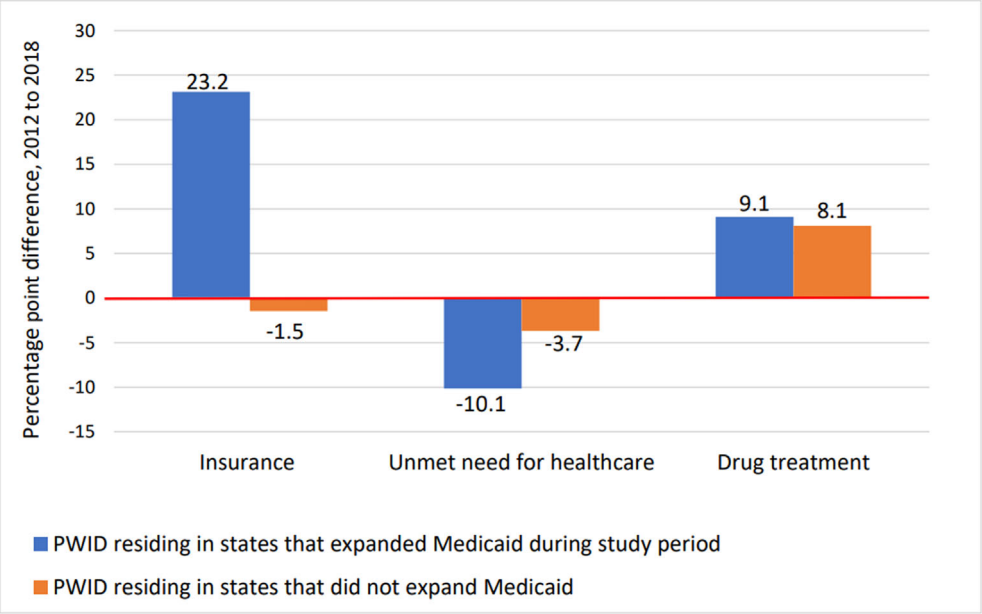
DISCUSSION

In the midst of US drug-related epidemics that disproportionately afflict impoverished PWID, our analyses found that Expansion is associated with increased health insurance coverage and reduced unmet need for medical care among impoverished PWID, but is unassociated with SUD treatment in this sample. Multivariable two-way fixed-effects models leveraged NHBS's unprecedented geographic and temporal scope, and indicate that Expansion was associated with a 19 percentage-point increase in the probability of health insurance coverage, and with a 9.0 percentage-point reduction in the probability

TABLE 1 Participant characteristics, overall and by residence Medicaid expansion states during the study period, for people who inject drugs (PWID), 2012, 2015 and 2018 Centers for Disease Control and Prevention's National HIV Behavioral Surveillance data (*n* = 19 946).

		PWID residing in states that expanded Medicaid during study period (*n* = 15 412)			PWID residing in states that did not expand Medicaid (*n* = 4534)		
	Overall	2012	2015	2018	2012	2015	2018
Characteristic	**(*n* = 19 946)**	**(*n* = 5120)**	**(*n* = 5329)**	**(*n* = 4963)**	**(*n* = 1751)**	**(*n* = 1433)**	**(*n* = 1350)**
Insured	13 662 (68.49)	3272 (63.91)	4276 (80.24)	4321 (87.06)	677 (38.66)	614 (42.85)	502 (37.19)
Unmet need for care	5818 (29.17)	1627 (31.78)	1396 (26.20)	1074 (21.64)	703 (40.15)	526 (36.71)	492 (36.44)
Drug treatment	7869 (39.46)	1905 (37.21)	2455 (46.07)	2305 (46.44)	362 (20.67)	449 (31.33)	393 (29.11)
Age (years), mean (SD)	44.27 (11.44)	45.77 (10.70)	42.73 (11.75)	42.62 (11.33)	47.73 (10.46)	45.39 (12.00)	45.05 (12.03)
Gender[a]							
Man	13 752 (68.95)	3534 (69.02)	3655 (68.59)	3246 (65.40)	1293 (73.84)	1066 (74.39)	958 (70.96)
Woman	6065 (30.41)	1561 (30.49)	1643 (30.83)	1670 (33.65)	446 (25.47)	359 (25.05)	386 (28.59)
Transgender	129 (0.65)	25 (0.49)	31 (0.58)	47 (0.95)	12 (0.69)	8 (0.56)	6 (0.44)
Race/ethnicity[a]							
White non-Hispanic	7291 (36.55)	1536 (30.00)	2359 (44.27)	2358 (47.51)	280 (15.99)	397 (27.70)	361 (26.74)
Black non-Hispanic	7976 (39.99)	2213 (43.22)	1693 (31.77)	1423 (28.67)	1174 (67.05)	771 (53.80)	702 (52.00)
Hispanic	4336 (21.74)	1278 (24.96)	1183 (22.20)	1077 (21.70)	281 (16.05)	247 (17.24)	270 (20.00)
Other	343 (1.72)	93 (1.82)	94 (1.76)	105 (2.12)	16 (0.91)	18 (1.26)	17 (1.26)
Annual household income[a]							
Less than $5000	8297 (41.60)	1965 (38.38)	2340 (43.91)	2131 (42.94)	770 (43.97)	541 (37.75)	550 (40.74)
$5000–9999	5510 (27.62)	1559 (30.45)	1410 (26.46)	1260 (25.39)	504 (28.78)	433 (30.22)	344 (25.48)
$10 000–14 999	4561 (22.87)	1262 (24.65)	1189 (22.31)	1131 (22.79)	336 (19.19)	339 (23.66)	304 (22.52)
More than $15 000	1578 (7.91)	334 (6.52)	390 (7.32)	441 (8.89)	141 (8.05)	120 (8.37)	152 (11.26)
High-school graduate/general educational diploma	13 156 (65.96)	3217 (62.83)	3557 (66.75)	3426 (69.03)	1086 (62.02)	961 (67.06)	909 (67.33)
Employment[a]							
Employed full or part-time	2355 (11.81)	535 (10.45)	563 (10.56)	560 (11.28)	252 (14.39)	206 (14.38)	239 (17.70)
Unable to work due to health	5878 (29.47)	1800 (35.16)	1511 (28.35)	1431 (28.83)	516 (29.47)	351 (24.49)	269 (19.93)
Not employed/other	11 713 (58.72)	2785 (54.39)	3255 (61.08)	2972 (59.88)	983 (56.14)	876 (61.13)	842 (62.37)
Incarceration[b]	7398 (37.09)	1703 (33.26)	2023 (37.96)	1873 (37.74)	701 (40.03)	583 (40.68)	515 (38.15)
Unhoused[b]	13 010 (65.23)	2839 (55.45)	3577 (67.12)	3577 (72.07)	1088 (62.14)	942 (65.74)	987 (73.11)
No. years since first injection, mean (SD)	20.82 (13.58)	22.93 (13.27)	19.53 (13.48)	18.45 (13.01)	24.83 (13.14)	22.03 (14.34)	20.13 (14.39)

[a]Percentages may not add to 100% due to rounding.
[b]In the past 12 months. SD = standard deviation.



a. Drug treatment outcome limited to PWID with daily drug use (2012 N = 5,520; 2018 N = 5,940)

FIGURE 1 Pre-/post-Medicaid expansion changes (2012 to 2018 percentage-point difference) in insurance, unmet need for health-care because of cost and drug treatment rates among people who inject drugs in 13 states, Centers for Disease Control and Prevention's National HIV Behavioral Surveillance data (2012 *n* = 6871; 2018 *n* = 6313).

of unmet need for medical care because of cost. Collectively, these results suggest that Expansion may indeed help to curb ongoing crises of drug-related epidemics in the United States, although progress remains to be made in its impact on SUD treatment participation.

Our findings concerning the association between Expansion and health insurance coverage among PWID living in poverty are consistent with, and build upon, prior studies [22–25]. Our findings add important depth to this body of work by focusing upon PWID, and by identifying an effect size for insurance coverage that surpasses that in prior studies. More specifically, the pre-/post-Expansion increase in health insurance coverage rates in this PWID sample—19.0 percentage points in multivariate analysis—is far higher than that reported in other samples of people who use drugs or in the general population. An analysis of NSDUH data, for example, found that insurance coverage was 12 percentage points higher post- versus pre-Expansion among impoverished people with heroin use disorder [23]. Health insurance coverage was 10.3 percentage points higher in a general population sample of impoverished childless adults [16].

The large increase among impoverished PWID testifies, in part, to the intersection of employment, insurance, and the War on Drugs and insurance have historically been linked to employment in the United States [47]. The War on Drugs and ancillary criminalization measures, however, curtail PWID labor market participation: some drug-related offenses have been reclassified as felonies [48], and many employers reject applicants with felony records, or indeed any record [49]. Because the War on Drugs falls heavily upon PWID [50], they may have benefitted more from Expansion than others who use drugs and than the general population.

Our findings also revealed that PWID in Expansion states were far less likely to report unmet need for medical care because of its cost post-expansion; exploratory analyses indicate that this relationship is fully mediated by increased insurance coverage. This finding parallels results of studies of Expansion's impact upon health service use in the general population [16, 21, 51, 52]. The 9 percentage-point reduction in unmet medical need in multivariable models represents a clinically meaningful reduction in unmet medical need. Primary care physicians and other providers are essential allies for PWID seeking to reduce drug-related harms [53–59]. These providers are entrusted with regularly testing PWID for HIV and HCV infection; screening patients for SUDs; and linking patients to specialty care or providing it themselves (e.g. medications to cure HCV or treat SUD) [53–60]. Connecting PWID to medical care is thus essential to support their health and survival, and Expansion appears to have fostered this connection for PWID in need.

Finally, analyses revealed that, although past-year SUD treatment participation increased in both Expansion and non-Expansion states, residence in an Expansion state did not confer an additional advantage. Across-sample increases in SUD treatment may stem from ACA provisions that effected PWID in all states, regardless of Expansion status, including the ACA's prioritization of integrating health-care services and SUD treatment [61]. Our finding that residence in an Expansion state conferred no additional advantage resonates with past research: prior analyses of survey data have found that Expansion itself is unrelated to SUD treatment in other populations with SUDs [28, 62].

Taken collectively, findings generated by these analyses—that is, that Expansion appears to increase insurance coverage rates and reduce unmet need for care without differentially increasing SUD treatment participation in Expansion states– are striking. This particular combination of findings suggests that greater efforts are needed to ensure that health insurance coverage gains and enhanced medical care engagement collectively translate into increased SUD treatment participation. Efforts may include practice-level reforms to ensure that providers who are meeting their PWID patients' medical needs more

TABLE 2 Characteristics for participants with daily drug use, overall and by residence Medicaid expansion states during the study period, for people who inject drugs (PWID), 2012, 2015 and 2018 Centers for Disease Control and Prevention's National HIV Behavioral Surveillance data (n = 17 584).

		PWID residing in states that expanded Medicaid during study period (n = 13 749)			PWID residing in states that did not expand Medicaid (n = 3835)		
	Overall	2012	2015	2018	2012	2015	2018
Characteristic	**(n = 17 584)**	**(n = 4169)**	**(n = 4874)**	**(n = 4706)**	**(n = 1351)**	**(n = 1250)**	**(n = 1234)**
Insured	12 001 (68.25)	2598 (62.32)	3868 (79.36)	4090 (86.91)	484 (35.83)	517 (41.36)	444 (35.98)
Unmet need for care	5219 (29.68)	1373 (32.93)	1315 (26.98)	1034 (21.97)	568 (42.04)	470 (37.60)	459 (37.20)
Drug treatment	6994 (39.77)	1554 (37.28)	2219 (45.53)	2181 (46.35)	286 (21.17)	393 (31.44)	361 (29.25)
Age (years), mean (SD)	43.76 (11.50)	45.3 (10.82)	42.35 (11.82)	42.41 (11.28)	46.91 (10.67)	44.98 (12.05)	44.59 (12.04)
Gender[a]							
Man	12 031 (68.42)	2853 (68.43)	3344 (68.61)	3078 (65.41)	970 (71.80)	922 (73.76)	864 (70.02)
Woman	5444 (30.96)	1295 (31.06)	1504 (30.86)	1586 (33.70)	373 (27.61)	321 (25.68)	365 (29.58)
Transgender	109 (0.62)	21 (0.50)	26 (0.53)	42 (0.89)	8 (0.59)	7 (0.56)	5 (0.41)
Race/ethnicity[a]							
White non-Hispanic	6545 (37.22)	1234 (29.60)	2165 (44.42)	2250 (47.81)	221 (16.36)	344 (27.52)	331 (26.82)
Black non-Hispanic	6849 (38.95)	1828 (43.85)	1537 (31.53)	1336 (28.39)	858 (63.51)	658 (52.64)	632 (51.22)
Hispanic	3887 (22.11)	1034 (24.80)	1088 (22.32)	1021 (21.70)	256 (18.95)	233 (18.64)	255 (20.66)
Other	303 (1.72)	73 (1.75)	84 (1.72)	99 (2.10)	16 (1.18)	15 (1.20)	16 (1.30)
Annual household income[a]							
Less than $5000	7443 (42.33)	1647 (39.51)	2162 (44.36)	2044 (43.43)	610 (45.15)	472 (37.76)	508 (41.17)
$5000–9999	4754 (27.04)	1229 (29.48)	1274 (26.14)	1189 (25.27)	380 (28.13)	379 (30.32)	303 (24.55)
$10 000–14 999	3977 (22.62)	1017 (24.39)	1076 (22.08)	1048 (22.27)	256 (18.95)	297 (23.76)	283 (22.93)
More than $15 000	1410 (8.02)	276 (6.62)	362 (7.43)	425 (9.03)	105 (7.77)	102 (8.16)	140 (11.35)
High-school graduate/general equivalency diploma	11532 (65.58)	2584 (61.98)	3229 (66.25)	3244 (68.93)	812 (60.10)	832 (66.56)	831 (67.34)
Employment[a]							
Employed full or part-time	2001 (11.38)	408 (9.79)	507 (10.40)	525 (11.16)	168 (12.44)	176 (14.08)	217 (17.59)
Unable to work due to health	5080 (28.89)	1469 (35.24)	1348 (27.66)	1335 (28.37)	391 (28.94)	305 (24.40)	232 (18.80)
Not employed/other	10 503 (59.73)	2292 (54.98)	3019 (61.94)	2846 (60.48)	792 (58.62)	769 (61.52)	785 (63.61)
Incarceration[b]	6756 (38.42)	1457 (34.95)	1910 (39.19)	1804 (38.33)	581 (43.01)	522 (41.76)	482 (39.06)
Unhoused[b]	11 707 (66.58)	2371 (56.87)	3318 (68.08)	3419 (72.65)	847 (62.69)	838 (67.04)	914 (74.07)
No. years since first injection, mean (SD)	20.43 (13.55)	22.68 (13.26)	19.35 (13.49)	18.24 (12.95)	24.31 (13.28)	21.75 (14.24)	19.87 (14.34)

[a]Percentages may not add to 100% due to rounding.
[b]In the past 12 months. SD = standard deviation.

TABLE 3 Difference-in-difference model results for the estimated effect of residence in a Medicaid expansion state on the probability of health insurance, unmet need for care because of cost or substance use disorder (SUD) treatment among people who inject drugs (PWID) in 2012, 2015 and 2018 Centers for Disease Control and Prevention's National HIV Behavioral Surveillance (n = 19 946; 17 584).

	Probability of health insurance (95% CI[a]), P-value n = 19 946	Probability of unmet need for care (95% CI[a]), P-value n = 19 946	Probability of SUD treatment (95% CI[a]), P-value n = 17 584[b]
Unadjusted models[c]			
Residence in a Medicaid expansion state[d]	0.21 (0.12, 0.29), 0.002	−0.08 (−0.16, 0.02), 0.084	0.02 (−0.02, 0.06), 0.232
Adjusted[e] models			
Residence in a Medicaid expansion state[d]	0.19 (0.09, 0.30), 0.006	−0.09 (−0.15, −0.002), 0.046	0.02 (−0.02, 0.06), 0.190

[a]The 95% confidence interval based on wild cluster bootstrap models, clustered for state and year.
[b]Sample for drug treatment outcome limited to PWID with daily drug use.
[c]Models include state and year fixed effect.
[d]Residence in a Medicaid expansion state as of the NHBS recall period for each year.
[e]Models include fixed effect for state and year and adjusted for metropolitan statistical areas (MSA) percentage incarcerated and individual characteristics (gender, race/ethnicity, income, education, employment, incarceration, unhoused status, injection duration, respondent status as a respondent-driven sampling (RDS) recruitment seed and network size).

effectively link them to SUD treatment. They may also include additional investments by policymakers to ensure that the SUD treatment programs are available and accessible to this population. It is also possible that there are specific subgroups within this broader sample for whom gains in health insurance may have been more (or less) likely to translate into increased SUD treatment utilization. Future research is needed to assess whether this association is significantly moderated by key covariates such as race/ethnicity and/or houselessness.

Limitations

COVID-19 pandemic disrupted 2021 NHBS data collection with PWID, and so analyses end before the pandemic's onset. The extent to which our findings generalize to the present is unknown. Because NHBS samples PWID within MSAs, findings may not be generalizable to rural areas or to non-sampled MSAs within the 13 states studied here. The CDC does not randomly sample MSAs to take part in NHBS. Tests comparing 2012 data on socio-demographic characteristics of the MSAs included in this analysis versus those of other large MSAs (with populations > 500 000) indicate rates of poverty, high-school graduation, unemployment, poverty and incarceration did not differ, although NHBS MSAs had higher percentages of non-Hispanic Black residents. They may also differ in unknown ways that affect generalizability. NHBS PWID samples may also differ from PWID living in the sampled NHBS MSAs: RDS does not necessarily produce samples that reflect the underlying population.

Data on unmet need for care, SUD treatment participation and insurance and other individual-level covariates were culled from surveys, and so are vulnerable to recall bias. Moreover, the relationship between Expansion and SUD treatment may have been attenuated in this sample because participation was contingent on past-year injecting, and people who participated in SUD treatment may thus have stopped injecting.

We were unable to examine whether data met DID's parallel trends assumption. Olfson *et al.*'s 2018 analyses of NSDUH data, however, suggest that pre-Expansion trends might be parallel: among impoverished people living with select SUDs, they found that SUD treatment rates and uninsurance rates (the inverse the outcome of interest here) were relatively stable in both Expansion and non-Expansion states between 2010/2011 and 2012/2013 (uninsurance rate: ∼35% in Expansion states and 42–45% in non-Expansion states; SUD treatment rates: 13–15% in Expansion states and 9–10% in non-Expansion states) [28]. Whether these trends mirror those within NHBS is unknown (e.g. NSDUH excludes unhoused individuals; Olfson *et al.* restricted their sample to individuals with select SUDs, and did not limit it to PWID).

CONCLUSIONS

Our findings—generated from NHBS's unprecedented sample of impoverished PWID surveyed across multiple years and US states—suggest that Expansion has resulted in sizeable gains in insurance coverage as well as reductions in unmet medical need among this structurally marginalized population. Expanding Medicaid to all US states will be an essential step to help curb drug-related harms among this structurally marginalized population. Our findings also highlight how expanded insurance coverage and reduced unmet need, while necessary, may not be sufficient to ensure that PWID receive SUD treatment. Practice-level and policy-level reforms will probably be needed to help close the SUD treatment chasm.

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DECLARATION OF INTERESTS

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

DATA AVAILABILITY STATEMENT

NHBS data are held at the CDC, and individuals must request access via that agency.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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