



Original Investigation | Substance Use and Addiction

Opioid Use Disorder and Evidence-Based Care Among Medicaid-Enrolled Youths

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Abstract

IMPORTANCE One in 100 adolescents and young adults (hereafter “youths”) in the US has an opioid use disorder (OUD), yet little is known about the extent to which they receive care aligned with national quality measures.

OBJECTIVE To evaluate progression through the OUD cascade of care (COC) among Medicaid-enrolled youths, with key stages of treatment aligned with national quality measures.

DESIGN, SETTING, AND PARTICIPANTS This cohort study used enrollment and health insurance claims from all US states and Washington, DC, from the 2016-2023 Transformed Medicaid Statistical Information System Analytic Files. Participants had OUD and were aged 13 to 25 years. Data were analyzed from November 3, 2025, to July 24, 2026.

EXPOSURES Diagnosis of OUD and receipt of addiction treatment, including behavioral health services and medications for OUD (MOUD; buprenorphine, methadone, or extended-release naltrexone).

MAIN OUTCOMES AND MEASURES Progression through COC stages aligned with national quality measures: treatment initiation, engagement, MOUD receipt, and 180-day MOUD retention.

RESULTS Among 229 847 youths with OUD enrolled in Medicaid (median age, 22 [IQR, 20-24] years; 117 920 females [51.3%]), 116 458 (50.7%) initiated treatment within 14 days of diagnosis, and 75 614 (32.9%) engaged in care (ie, had 2 or more additional treatment encounters within 34 days of treatment initiation). Among the 75 614 youths who engaged in treatment, 35 011 (46.3%) received MOUD, representing 15.2% of all 229 847 youths with OUD. However, only 554 of 8352 adolescents younger than 18 years who engaged in treatment received MOUD (6.6%), compared with 34 457 of 67 262 young adults 18 years and older (51.2%). Buprenorphine was the most initiated medication (n = 23 990 of 35 011 [68.5%]), followed by methadone (n = 8911 [25.5%]) and extended-release naltrexone (n = 2110 [6.0%]). Overall, only 7070 of 229 847 youths (3.1%) continued medication for 180 days or more. Among youths receiving MOUD, retention was highest for methadone (n = 2334 of 8911 [26.2%]), followed by buprenorphine (n = 4613 of 23 990 [19.2%]) and extended-release naltrexone (n = 123 of 2110 [5.8%]). Median time receiving MOUD varied by medication: methadone, 59 days (IQR, 15-189 days); buprenorphine, 45 days (IQR, 18-128 days); and extended-release naltrexone, 31 days (IQR, 28-82 days) (log-rank test, $P < .001$). Younger adolescents aged 13 to 15 years and racially minoritized youths had consistently lower progression through the COC.

CONCLUSIONS AND RELEVANCE In this cohort study of Medicaid-enrolled youths with OUD, most did not receive timely, evidence-based treatment, and only 1 in 32 received sustained

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Key Points

Question To what extent do Medicaid-enrolled adolescents and young adults with opioid use disorder (OUD) receive evidence-based care and progress through key stages of treatment (ie, initiation, engagement, receipt of addiction medication, and retention)?

Findings In this cohort of 229 847 Medicaid-enrolled adolescents and young adults with OUD, approximately half of those enrolled initiated treatment and one-third engaged in care. Overall, 1 in 6 received medication for OUD (46% of those engaged in care), and 1 in 32 had 180 days or more of medication retention.

Meaning These findings suggest large gaps exist across the OUD cascade of care for adolescents and young adults, highlighting the need for policies and care models that expand medication access and improve treatment retention.

+ Supplemental content

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Abstract (continued)

pharmacotherapy. Gaps and persistent disparities exist across the COC, particularly for youths of color, underscoring the need for policies and care models that expand equitable treatment access.

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Introduction

Approximately 1 in 100 adolescents and young adults (aged 13 to 25 years; hereafter, youths) in the US has an opioid use disorder (OUD) according to national estimates.¹ Untreated OUD during adolescence and young adulthood is associated with immediate and lifelong consequences, including risk of overdose, transmission of human immunodeficiency virus and hepatitis C, mental health problems, criminal justice involvement, and disruptions to educational attainment, employment, and social functioning.^{2,3} Since 2019, overdose deaths have increased more than 4-fold among those aged 25 years and younger,^{4,5} largely driven by the widespread presence of illicitly manufactured fentanyl in the drug supply.^{4,6,7} As a result, overdoses and poisonings are now a leading cause of death during adolescence and young adulthood.^{8,9}

To prevent premature mortality and improve health outcomes, numerous professional organizations recommend that youths with OUD are rapidly connected to evidence-based care, including treatment with medications for OUD (MOUD; ie, buprenorphine, methadone, or extended-release naltrexone).^{3,10-12} Although such organizations recommend MOUD for all ages, including adolescents younger than 18 years, age-based constraints nonetheless differ by medication. Buprenorphine is approved by the US Food and Drug Administration for individuals aged 16 years and older, and, historically, federal methadone regulations have required individuals younger than 18 years to have 2 documented attempts at withdrawal management without medication before receiving methadone. Extended-release naltrexone has no federal age-based restrictions.

National quality measures for substance use disorder care emphasize timely initiation and successful engagement in treatment, alongside continuous use of MOUD.^{13,14} Specifically, the Medicaid Adult Core Set includes 3 validated measures: Initiation of Treatment, Engagement of Treatment, and Use of Pharmacotherapy for OUD.^{15,16} In addition, a newly endorsed quality measure evaluates 180-day MOUD continuity, recognizing that longer treatment durations are associated with improved outcomes.^{14,17} However, little is known about how youths progress through these stages of OUD treatment—particularly within Medicaid, the primary insurer for youth behavioral health care in the US.¹⁸ Examining OUD quality measures in this age group is paramount, as these measures were developed and validated primarily in adult populations rather than in adolescents. Understanding the extent to which youths reach key OUD treatment milestones is essential to improving outcomes and reducing mortality.

The cascade of care (COC) framework, which has been successfully applied in chronic disease management, offers a valuable model for examining the extent to which youth OUD treatment is aligned with these quality measures.¹⁹ The COC delineates 5 stages of OUD care: diagnosis, initiation of treatment, engagement, receipt of MOUD, and retention of MOUD. Applied to youths, this framework could enable standardized assessments of treatment quality, comparisons across demographic groups and comorbid conditions (eg, mental health diagnoses), and identification of targets for population-level interventions.^{13,19} Yet to date, the COC framework has not been applied to assess youth care delivery at a national scale. These data are key to informing Medicaid plan design, service delivery, and policies to improve quality and equity in youth OUD care.^{20,21} Additionally, characterizing which specific medication youths receive, and whether treatment retention differs by MOUD type, may provide important insights into treatment effectiveness and care delivery.

We conducted a national evaluation to identify gaps in the COC for youths with OUD. Using comprehensive Medicaid data from all 50 states and Washington, DC, we assessed COC stage

progression among youths aged 13 to 25 years from 2016 to 2023, assessing the proportion of youths advancing through each stage, identifying gaps across demographic groups, and examining patterns of MOUD receipt and retention. Because the clinical indication for MOUD does not vary by age, we applied the full COC framework across ages 13 to 25 years, reporting age-stratified findings.

Methods

Study Design

We conducted a retrospective cohort study using the Transformed Medicaid Statistical Information System Analytic Files from January 2016 to December 2023.²² We included all Medicaid-enrolled youths aged 13 to 25 years across all 50 states and Washington, DC, including all claims from inpatient, outpatient, emergency department, pharmacy, and behavioral health settings.

To center the perspectives of youths and families affected by OUD, we convened an advisory board composed of youths with lived experience of OUD, parents and/or guardians of youths receiving treatment, and case managers supporting youths with OUD (N = 9). The board met regularly to provide input on variable selection, treatment access, and interpretation of findings to ensure alignment with lived experience.

We adhered to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) reporting guideline and reporting standards for use of the dataset (eTable 1, eMethods in Supplement 1).^{23,24} The Mass General Brigham Institutional Review Board deemed this study exempt from review and the informed consent requirement because it was secondary research for which consent is not required.

Sample

To construct the analytic cohort, we first identified all youths with an incident documented OUD diagnosis between July 1, 2016, and June 30, 2023 (eFigure 1 in Supplement 1). We defined a new diagnosis of OUD as 1 or more *International Classification of Diseases, 10th Revision (ICD-10)* diagnosis codes of F11.1x or F11.2x (excluding codes indicating an individual's OUD was in remission), with a washout period of 6 months or more of continuous enrollment prior to the index OUD diagnosis without any preceding OUD diagnosis or receipt of MOUD (ie, buprenorphine, methadone, or extended-release naltrexone).¹⁶ The date of the first observed OUD diagnosis was defined as the index date. We additionally required 6 months or more of continuous enrollment after the index date to ascertain outcomes. Consistent with precedent literature, we excluded youths with dual eligibility for Medicare (eg, typically for disability status), since Medicare is the first payor for MOUD (ie, rather than Medicaid).²⁵

Outcomes

We operationalized the stages of the COC based on existing literature and national quality measures.¹³⁻¹⁷ Detailed variable definitions are publicly available.²⁶ Diagnosis was defined as previously described herein for inclusion in the analytic cohort, that is, 1 or more OUD diagnosis based on *ICD-10* codes F11.1x or F11.2x (excluding diagnoses marked in remission) or receipt of buprenorphine or methadone with a subsequent OUD diagnosis at any point during follow-up.¹⁶ Initiation was the receipt of any treatment (behavioral health services or MOUD) within 14 days of diagnosis.¹⁵ We identified behavioral health services based on *Current Procedural Terminology (CPT)* and Healthcare Common Procedure Coding System (HCPCS) codes for outpatient counseling, intensive outpatient, partial hospitalization, residential, or inpatient services. We identified MOUD receipt based on dispensing in pharmacy claims using National Drug Codes (for buprenorphine and extended-release naltrexone), or *CPT* and HCPCS codes for clinic-based administration (for any of the 3 medications).^{15,16} Engagement was documentation of 2 or more additional treatment encounters (behavioral health services or MOUD) within 34 days of treatment initiation.¹⁵ MOUD receipt was receipt of buprenorphine, methadone, or extended-release naltrexone at any time during the

engagement period.^{14,16} Retention for 180 days was defined as continuous receipt of MOUD for 180 days or more, allowing for a treatment gap of no more than 7 days. For this outcome, we included youths who switched medications during the 180 days and had no MOUD gap exceeding 7 days, per national quality measure specifications.¹⁷ Each stage was nested in the preceding stage, such that an individual could only progress to the next stage if they met the previous stage's definition.¹⁹

Covariates

We assessed individual-level sociodemographic variables, including age, sex, and race and ethnicity (American Indian or Alaska Native, non-Hispanic; Asian, non-Hispanic; Black, non-Hispanic; Hawaiian or Other Pacific Islander; Hispanic, any race; White, non-Hispanic; multiracial, non-Hispanic; or other, non-Hispanic [comprising any race or ethnicity not otherwise specified]). Race and ethnicity were ascertained from Medicaid administrative enrollment records, in which categories are defined by state Medicaid agencies and are generally reported by beneficiaries or their caregivers at enrollment. Race and ethnicity were assessed because prior studies document inequities in access to and quality of OUD treatment.^{20,27-29} We also classified individuals by Medicaid eligibility category (income-based, disability-based, or foster care or adoption). We identified co-occurring diagnoses during the 6 months prior to or on the index date, including mental health disorders, substance use disorders, and opioid-related overdoses.²⁶

Statistical Analysis

We calculated the percentage of youths progressing through each COC stage overall and stratified by age, sex, race and ethnicity, and study year. Consistent with the descriptive aims of the COC framework and the large sample size, in which small differences would attain statistical significance, comparisons of stage progression across subgroups were summarized descriptively without formal hypothesis testing. Given known data quality issues for race and ethnicity variables in Medicaid data, we referred to the *Medicaid Data Quality Atlas* to identify state-year observations with higher-quality reporting and used each individual's highest-quality state-year observation to assign race and ethnicity.³⁰

To further delineate characteristics of youths according to the specific medication they received (if any), we tabulated study covariates by MOUD type. We also quantified the percentage of youths who switched medications and the median time to a switch. Next, we examined differences in retention of MOUD by sociodemographic variables, year of OUD diagnosis, and the specific medication initiated using the Kaplan-Meier method and log-rank tests.

We conducted a sensitivity analysis using an alternative definition of initiation, defined as receipt of behavioral health services or MOUD within 30 days of diagnosis (rather than the nationally used definition of 14 days).¹⁵ We also conducted sensitivity analyses of alternative definitions of retention, defining MOUD discontinuation as occurring when a gap in MOUD exceeded 14 days and 30 days (rather than the nationally used definition of >7 days).^{14,17} Sensitivity analyses were conducted based on recommendations from the study's advisory board. All statistical tests were 2 sided, with significance defined as $P < .05$. All analyses were performed using SAS Enterprise Guide 8.5 (SAS Institute) and R Studio, version 4.4.3 (R Project for Statistical Computing). Data were analyzed from November 3, 2025, to July 24, 2026.

Results

We identified 229 847 Medicaid-enrolled youths aged 13 to 25 years with OUD between July 1, 2016, and June 30, 2023. The median age was 22 (IQR, 20-24) years, and 117 920 youths (51.3%) were female and 111 927 (48.7%) were male (**Table 1**; eTable 2 in [Supplement 1](#)). The racial and ethnic composition of the sample is as follows: 7412 American Indian or Alaska Native, non-Hispanic (3.2%); 2027 Asian, non-Hispanic (0.9%); 32 055 Black, non-Hispanic (13.9%); 676 Hawaiian or Other Pacific

Table 1. Characteristics of Youths With Diagnoses of Opioid Use Disorder (OUD) and Enrolled in Medicaid Programs in 50 US States and Washington, DC, 2016-2023

Characteristic	No. (%) (N = 229 847)
Age at time of diagnosis, y	
13-15	9050 (3.9)
16-17	16 804 (7.3)
18-19	26 853 (11.7)
20-21	41 787 (18.2)
22-23	58 286 (25.4)
24-25	77 067 (33.5)
Sex	
Female	117 920 (51.3)
Male	111 927 (48.7)
Race and ethnicity ^a	
American Indian or Alaska Native, non-Hispanic	7412 (3.2)
Asian, non-Hispanic	2027 (0.9)
Black, non-Hispanic	32 055 (13.9)
Hawaiian or Other Pacific Islander	676 (0.3)
Hispanic, any race	33 662 (14.7)
White, non-Hispanic	135 249 (58.8)
Multiracial, non-Hispanic	2332 (1.0)
Other, non-Hispanic	1222 (0.5)
Medicaid eligibility	
Income-based	213 936 (93.1)
Disability-based	4820 (2.1)
Foster care or adoption	11 091 (4.8)
Region	
Northeast	47 325 (20.6)
Midwest	49 814 (21.7)
South	69 844 (30.4)
West	62 864 (27.4)
Mental health disorder ^b	
Anxiety disorder	55 276 (24.1)
Attention deficit hyperactivity disorder	18 937 (8.2)
Bipolar disorder	23 741 (10.3)
Depressive disorder	61 242 (26.6)
Disruptive, impulse control, and conduct disorders	11 777 (5.1)
Eating disorder	1010 (0.4)
Obsessive-compulsive and related disorders	296 (0.1)
Personality disorder	6517 (2.8)
Schizophrenia and psychotic disorders	16 057 (7.0)
Somatic disorder	951 (0.4)
Suicidal ideation or attempt	26 336 (11.5)
Trauma-related disorder	29 626 (12.9)
Substance use disorder, overdose ^b	
Alcohol	32 528 (14.2)
Benzodiazepines and other sedatives	12 406 (5.4)
Cannabis	55 542 (24.2)
Nicotine	54 338 (23.6)
Stimulants	47 183 (20.5)
Opioid-related overdose	14 025 (6.1)

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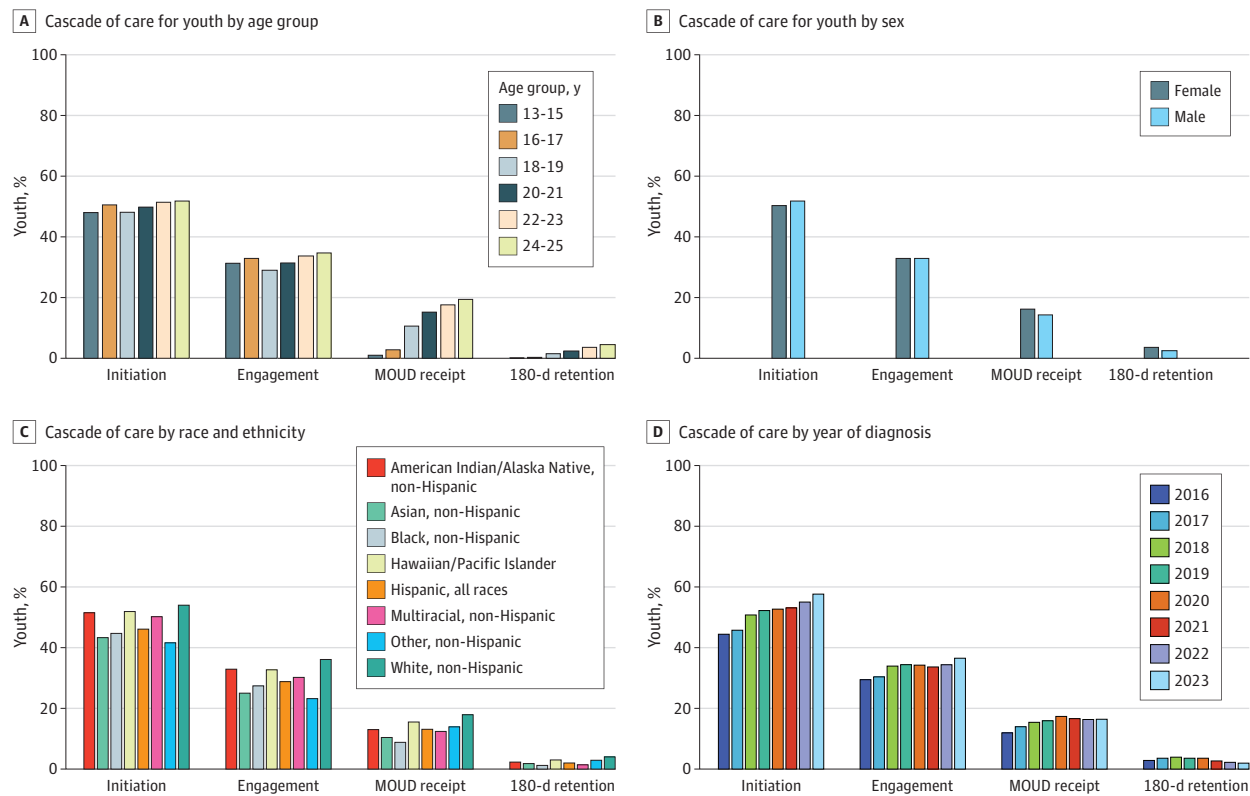
Table 1. Characteristics of Youths With Diagnoses of Opioid Use Disorder (OUD) and Enrolled in Medicaid Programs in 50 US States and Washington, DC, 2016-2023 (continued)

Characteristic	No. (%) (N = 229 847)
Year of diagnosis	
2016	36 641 (15.9)
2017	36 848 (16.0)
2018	29 290 (12.7)
2019	24 209 (10.5)
2020	26 369 (11.5)
2021	31 246 (13.6)
2022	31 230 (13.6)
2023	14 014 (6.1)

^a An additional 15 212 (6.6%) youths were missing race and ethnicity information; the category of “other, non-Hispanic” comprised youths of any race or ethnicity not otherwise specified. Race and ethnicity were ascertained from Medicaid administrative enrollment records, in which categories are defined by state Medicaid agencies and are generally reported by beneficiaries or their caregivers at enrollment.

^b At the same time or during the 6 months preceding an OUD diagnosis.

Figure 1. The Cascade of Care for Youths With Opioid Use Disorder Enrolled in Medicaid Programs, 2016-2023



Programs in the analysis were located across 50 US states and Washington, DC. MOUD indicates medication for opioid use disorder.

Islander (0.3%); 33 662 Hispanic, any race (14.7%); 2332 multiracial, non-Hispanic (1.0%); 1222 other race or ethnicity (0.5%); and 135 249 White, non-Hispanic (58.8%).

The most common co-occurring mental health conditions were depressive disorders (26.6%), anxiety disorders (24.1%), and trauma-related disorders (12.9%). The most common co-occurring substance use disorders were related to cannabis (24.2%), nicotine (23.6%), and stimulants (20.5%), and 6.1% of youths had an opioid overdose in the past 6 months.

Overall, 116 458 youths (50.7%) initiated treatment within 14 days of OUD diagnosis (Figure 1; eTable 3 in Supplement 1). Treatment initiation was broadly similar across age groups (eg, age 13 to 15 years: 48.0%; age 24 to 25 years: 51.8%) and sexes (50.3% female and 51.1% male youths). Across racial and ethnic groups, initiation was highest among Hawaiian or Other Pacific Islander (51.9%),

non-Hispanic American Indian or Alaska Native (51.5%), and non-Hispanic White (54.0%) youths, and lowest among non-Hispanic youths of other race and ethnicity (40.8%) and non-Hispanic Asian youths (43.4%). Initiation steadily increased during the study period, with the lowest percentage in 2016 (44.5%) and the highest in 2023 (57.7%).

Among those who initiated treatment, 75 614 youths (64.9%) engaged in care (ie, had 2 or more additional treatment encounters within 34 days of treatment initiation), representing 32.9% of all youths with diagnoses of OUD. Engagement was most common among youths aged 24 to 25 years (34.7%) and least common among those aged 18 to 19 (29.0%); male and female youths were equally likely to experience successful engagement (32.9% each). Engagement was highest among non-Hispanic White youths (36.1%) and lowest among non-Hispanic Asian youths (25.0%) and non-Hispanic youths of other races and ethnicities (23.2%). Engagement fluctuated over the study period, with the highest percentage in 2023 (36.6% of all youths diagnosed with OUD) and the lowest in 2016 (29.3%).

Among those who engaged in treatment, 35 011 (46.3%) received MOUD, representing 15.2% of all youths with diagnoses of OUD. MOUD receipt meaningfully increased in association with age of OUD diagnosis, with only 1.0% of all youths aged 13 to 15 years with OUD receiving MOUD ($n = 88$ of 9050; 3.1% of those engaged in treatment [$n = 88$ of 2830]), compared with 19.4% of all youths aged 24 to 25 years ($n = 14 984$ of 77 067; 56.1% of those engaged in treatment [$n = 14 984$ of 26 731]). Among those engaged in treatment, only 6.6% of adolescents younger than 18 years ($n = 554$ of 8352) received MOUD, compared with 51.2% of young adults 18 years and older ($n = 34 457$ of 67 262). MOUD receipt was also more common in female and non-Hispanic White individuals and less common in non-Hispanic Black individuals, who were half as likely as White individuals to receive MOUD. MOUD receipt increased from 2016 (11.9% of all youths with OUD) to 2020 (17.4%) and then slightly decreased in 2021 (16.7%) and plateaued through 2023 (16.4%).

Among the 75 614 youths engaged in treatment, 23 990 (31.7%) received buprenorphine, 8911 (11.8%) methadone, and 2110 (2.8%) extended-release naltrexone, and 40 603 (53.7%) received only behavioral health services without MOUD (**Table 2**). Among youths younger than age 18 years, buprenorphine was the only MOUD received (data for methadone and extended-release naltrexone have been suppressed due to counts of 10 or fewer). Buprenorphine and extended-release naltrexone receipt were relatively more common among non-Hispanic White individuals relative to other racial and ethnic groups.

Among youths who received MOUD, 7070 (20.2%) received medication for 180 days or more, representing 3.1% of all youths with diagnoses of OUD. Retention for 180 days or more was more common among female youths (3.6% of all female youths with OUD [$n = 4280$ of 117 920]) than male youths (2.5% [$n = 2790$ of 111 927]) and was highest among non-Hispanic White youths (4.0% [$n = 5360$ of 135 249]) and lowest among non-Hispanic Black youths (1.2% [$n = 368$ of 32 055]) (eFigure 2 in [Supplement 1](#)). Retention also increased with age, from 0.3% among those aged 16 and 17 years with OUD to 4.5% of those aged 24 to 25 years (data for those aged 13-15 years have been suppressed due to low counts). Retention peaked in 2018 (3.9% of all youths diagnosed with OUD that year) and then steadily decreased, reaching its lowest point in 2023 (1.9%). Among 35 011 youths receiving MOUD, 741 (2.1%) switched to a different medication; the median time to a switch was 63 (IQR, 16-204) days.

Among the 35 011 youths who received MOUD, 180-day retention varied by the first medication received: 4613 of 23 990 (19.2%) for buprenorphine, 2334 of 8911 (26.2%) for methadone, and 123 of 2110 (5.8%) for extended-release naltrexone (**Figure 2**). Retention on MOUD was lower in more recent study years (180-day retention, 24.4% among youths who received diagnoses in 2016-2017 vs 13.0% among those who received diagnoses in 2022-2023; **Figure 2B**), a difference driven by poorer retention on buprenorphine (eFigures 3 and 4 in [Supplement 1](#)). The median duration of MOUD was 48 (IQR, 18-138) days. According to initial medication received, median time receiving buprenorphine was 45 (IQR, 18-128) days; methadone, 59 (IQR, 15-189) days; and extended-release naltrexone, 31 (IQR, 28-82) days.

Table 2. Receipt of First Medication for Opioid Use Disorder (OUD) Among Youths Enrolled in Medicaid and Engaged in Treatment in 50 US States and Washington, DC, 2016-2023^a

Characteristic	Youths, No. (%) (N = 75 614)			
	Buprenorphine (n = 23 990)	Methadone (n = 8911)	Extended-release naltrexone (n = 2110)	Behavioral health only (n = 40 603)
Age at time of diagnosis, y				
13-15	74 (2.6)	ND	ND	2742 (96.9)
16-17	421 (7.6)	ND	ND	5056 (91.6)
18-19	2090 (26.9)	586 (7.5)	180 (2.3)	4921 (63.3)
20-21	4414 (33.7)	1535 (11.7)	390 (3.0)	6773 (51.7)
22-23	7051 (35.9)	2619 (13.3)	608 (3.1)	9364 (47.7)
24-25	9940 (37.2)	4155 (15.5)	889 (3.3)	11 747 (44.0)
Sex				
Female	12 824 (33.1)	5065 (13.1)	1161 (3.0)	19 747 (50.9)
Male	11 166 (30.3)	3846 (10.5)	949 (2.6)	20 856 (56.7)
Race and ethnicity ^b				
American Indian or Alaska Native, non-Hispanic	700 (28.7)	218 (9.0)	41 (1.7)	1477 (60.6)
Asian, non-Hispanic	146 (28.8)	62 (12.2)	ND	≥289 (≥57.0)
Black, non-Hispanic	1992 (22.7)	710 (8.1)	117 (1.3)	5959 (67.9)
Hawaiian or Other Pacific Islander	65 (29.4)	36 (16.3)	ND	≥110 (≥49.7)
Hispanic, any race	2690 (27.7)	1580 (16.3)	125 (1.3)	5309 (54.7)
White, non-Hispanic	16 830 (34.5)	5752 (11.8)	1654 (3.4)	24 610 (50.4)
Multiracial, non-Hispanic	210 (29.9)	69 (9.8)	ND	≥414 (≥58.8)
Other, non-Hispanic	131 (46.3)	29 (10.2)	ND	≥113 (≥39.9)
Medicaid eligibility				
Income-based	23 017 (32.4)	8556 (12.1)	2002 (2.8)	37 385 (52.7)
Disability-based	281 (27.1)	97 (9.3)	41 (4.0)	619 (59.6)
Foster care or adoption	692 (19.1)	258 (7.1)	67 (1.9)	2599 (71.9)
Region				
Northeast	4254 (29.6)	1482 (10.3)	495 (3.5)	8129 (56.6)
Midwest	5940 (30.8)	1300 (6.7)	779 (4.0)	11 266 (58.4)
South	7600 (33.5)	2445 (10.8)	596 (2.6)	12 063 (53.1)
West	6196 (32.2)	3684 (19.1)	240 (1.3)	9145 (47.5)
Mental health disorder ^c				
Anxiety disorder	5056 (27.2)	1101 (5.9)	546 (2.9)	11 921 (64.0)
Attention deficit hyperactivity disorder	1068 (17.7)	232 (3.8)	116 (1.9)	4626 (76.6)
Bipolar disorder	1562 (19.9)	355 (4.5)	264 (3.4)	5654 (72.2)
Depressive disorder	4546 (22.0)	845 (4.1)	623 (3.0)	14 619 (70.9)
Disruptive, impulse-control, and conduct disorders	321 (8.0)	31 (0.8)	46 (1.1)	3627 (90.1)
Eating disorder	57 (15.9)	ND	ND	281 (78.5)
Obsessive-compulsive and related disorders	12 (14.0)	ND	ND	67 (77.9)
Personality disorder	335 (16.5)	66 (3.3)	67 (3.3)	1564 (77.0)
Schizophrenia and psychotic disorders	637 (14.8)	139 (3.2)	82 (1.9)	3447 (80.1)
Somatic disorder	44 (18.9)	ND	ND	173 (74.3)
Suicidal ideation or attempt	1268 (16.7)	197 (2.6)	230 (3.0)	5891 (77.7)
Trauma-related disorder	2016 (18.4)	388 (3.6)	249 (2.3)	8289 (75.8)

(continued)

Table 2. Receipt of First Medication for Opioid Use Disorder (OUD) Among Youths Enrolled in Medicaid and Engaged in Treatment in 50 US States and Washington, DC, 2016-2023^a (continued)

Characteristic	Youths, No. (%) (N = 75 614)			
	Buprenorphine (n = 23 990)	Methadone (n = 8911)	Extended-release naltrexone (n = 2110)	Behavioral health only (n = 40 603)
Substance use disorder, overdose ^c				
Alcohol	1741 (14.8)	232 (2.0)	479 (4.1)	9308 (79.2)
Benzodiazepines and other sedatives	935 (24.7)	122 (3.2)	121 (3.2)	2603 (68.8)
Cannabis	3273 (16.7)	422 (2.2)	496 (2.5)	15 388 (78.6)
Nicotine	5455 (34.9)	1164 (7.4)	554 (3.5)	8481 (54.2)
Stimulants	3568 (22.3)	496 (3.1)	608 (3.8)	11 331 (70.8)
Opioid-related overdose	958 (32.6)	271 (9.2)	159 (5.4)	1553 (52.8)
Year of diagnosis				
2016	2469 (23.0)	1485 (13.8)	395 (3.7)	6393 (59.5)
2017	3464 (31.0)	1277 (11.4)	386 (3.5)	6033 (54.1)
2018	3172 (31.9)	1055 (10.6)	275 (2.8)	5436 (54.7)
2019	2728 (32.8)	889 (10.7)	207 (2.5)	4502 (54.1)
2020	3213 (35.7)	1136 (12.6)	235 (2.6)	4426 (49.1)
2021	3671 (34.8)	1298 (12.3)	242 (2.3)	5347 (50.6)
2022	3629 (33.7)	1238 (11.5)	255 (2.4)	5635 (52.4)
2023	1644 (32.1)	533 (10.4)	115 (2.2)	2831 (55.3)

^a ND (not defined) cells indicate counts ≤10 and are suppressed to protect the confidentiality of Medicaid beneficiaries in accordance with Centers for Medicare and Medicaid Services policy; in such cases, the cell in the column “Behavioral health only” has been countersuppressed where needed to prevent back-calculation of small cells.

^b An additional 4136 (27.2%) youths were missing race and ethnicity information, including 1226 youths who received buprenorphine (29.6% of this subgroup), 455 who received methadone (11.0%), 147 who received extended-release naltrexone (3.6%), and 2308 who received only behavioral health services (55.8%); the category “Other, non-Hispanic” comprised youths of any race or ethnicity not otherwise specified.

^c At the same time or during the 6 months preceding an OUD diagnosis.

In the first sensitivity analysis with the initiation measure requiring treatment within 30 days, 128 395 of 229 847 youths (55.9%) attained the measure, an increase of 5.2 percentage points relative to the nationally defined 14-day window.¹⁵ The second sensitivity analysis examined alternative definitions of MOUD retention in which discontinuation was defined as an MOUD gap greater than 14 days and greater than 30 days (rather than the nationally defined >7-day gap^{14,17}) and revealed that 180-day retention was higher when using more relaxed definitions for MOUD continuity (eTable 4 in Supplement 1). When discontinuation was defined as occurring after a greater than 14-day MOUD gap, 180-day retention was reached by 9447 youths (4.1% of all youths diagnosed with OUD), and when defined as occurring after a greater than 30-day gap, by 12 127 youths (5.3%). Across definitions, disparities by age, sex, and race and ethnicity persisted.

Discussion

In this national study of Medicaid-enrolled youths aged 13 to 25 years with OUD, we found attrition at each stage of the COC and correspondingly low attainment of national quality measures. Approximately half of all youths with OUD initiated treatment within 14 days of diagnosis, and, among these youths, two-thirds successfully engaged in treatment. Fewer than half of youths who engaged in treatment received MOUD, and, among them, only 1 in 5 remained continuously receiving MOUD for 180 days or more. Ultimately, only 3.1% (or 1 in 32) of youths diagnosed with OUD reached all COC stages, thus meeting national treatment standards. Disparities by age and by race and ethnicity were notable: younger adolescents had markedly lower MOUD receipt and retention, and non-Hispanic Black youths, along with several other minoritized groups (including Asian, Hispanic, and multiracial youths), had lower progression through most COC stages, although patterns varied by group and stage.

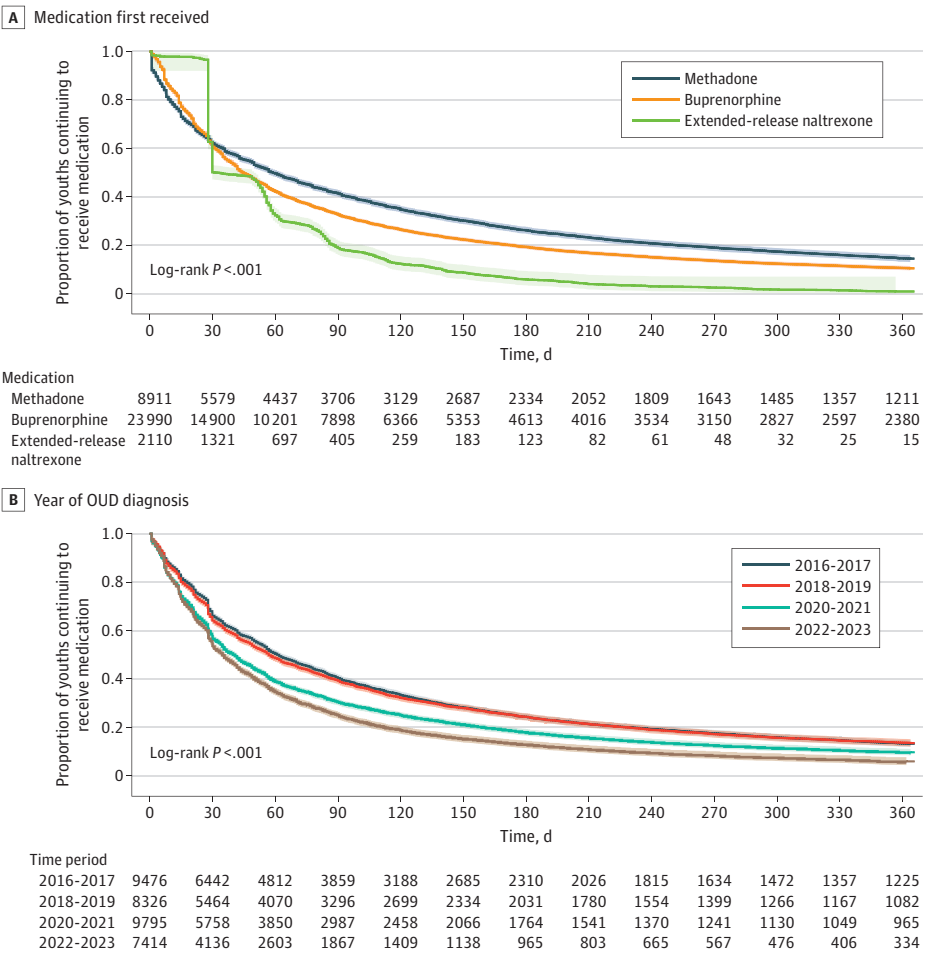
These findings align with prior analyses showing underuse of pharmacotherapy and limited treatment engagement.^{20,27,31-34} Our findings are also consistent with an earlier 11-state Medicaid analysis showing that only 1 in 5 adolescents and 1 in 4 young adults received MOUD within 3 months

of diagnosis.²⁷ Notably, in Medicaid programs, the percentage of youths receiving MOUD is lower than that of adults, among whom approximately half receive MOUD overall (although substantial variability exists across US states).^{28,35}

Critically, we also found that methadone was associated with the highest rates of treatment retention, followed by buprenorphine. Yet methadone provision was nearly entirely absent for those younger than 18 years. The near absence of methadone use among adolescents is notable and likely reflects regulatory constraints (eg, federal and state restrictions on methadone provision for individuals younger than 18 years). Buprenorphine use was also uncommon in this age group, including those aged 16 or 17 years, for whom the medication is approved. Regulation alone does not explain these gaps; extended-release naltrexone, which carries no comparable federal age-based restriction, was likewise rarely received by adolescents in our sample. Attrition from treatment with extended-release naltrexone was high; only approximately half of youths received their second monthly dose on time, and fewer than one-third received their third monthly dose. These gaps in MOUD receipt are particularly concerning in light of national prescribing data suggesting that buprenorphine prescribing to young adults is decreasing despite rising rates of OUD—a finding reflected in our study, which showed a plateau in MOUD provision after 2020 and mirrors broader challenges in improving outcomes during the COVID-19 and fentanyl era.^{1,34,36}

Improving receipt of evidence-based care will likely require interventions at each COC stage. For example, universal substance use screening—recommended by the American Academy of Pediatrics—may detect more cases of OUD,^{37,38} but improving treatment initiation will require

Figure 2. Continuation of Medications for Opioid Use Disorder (MOUD)



stronger linkage to care and greater capacity among primary care clinicians to provide MOUD.^{25,26} This strategy might also enhance engagement and MOUD retention because primary care clinicians can build on trusted relationships with youths and families and offer sustained support through young adulthood.^{12,39-41} Treatment in general practice settings may also mitigate the gap in MOUD provision in US residential addiction treatment programs, among which only 1 in 4 offer buprenorphine to adolescents.^{42,43}

As clinicians, health systems, and policymakers work to improve OUD care, they should consider whether current specifications for national quality measures are appropriate for youths. We found that relaxing the definition for MOUD discontinuation (ie, allowing for a gap in MOUD >14 days or >30 days instead of >7 days) was associated with more youths achieving 180-day retention of MOUD, consistent with prior work assessing definitions of discontinuation.⁴⁴ Since youths have brief lapses in their OUD care, it is possible more relaxed definitions may be appropriate for this age group.³³ However, relaxing these definitions should be closely mapped to clinical outcomes, such as overdose, risk for which is likely to increase during lapses in MOUD.²⁹ Our unanticipated finding that MOUD retention worsened in more recent years warrants further study as it may be related to patient-level factors, clinician behavior, systems of care, insurance plan design, and/or the regulatory and policy environment.

Racial and ethnic inequities were notable across COC stages. These inequities were not uniform across groups or stages; for example, initiation and engagement among non-Hispanic American Indian or Alaska Native youths were similar to those among non-Hispanic White youths, whereas their MOUD receipt and 180-day retention were lower, suggesting that barriers may concentrate at later stages of care for some groups. These disparities may reflect a confluence of clinician bias, differential access to high-quality treatment programs, mistrust of the health care system, and broader social inequities that limit continuity of care.^{20,35,45-47} Additionally, youths and family perceptions and preferences regarding MOUD may vary by race and ethnicity.⁴⁸ Medicaid programs should monitor treatment equity, disaggregate metrics by race and ethnicity, and invest in interventions designed to reduce disparities.^{13,21,49} This could include culturally responsive care models, language-access services, community partnerships, and workforce development to increase treatment capacity in underserved areas.⁴⁸⁻⁵⁰ Medicaid policy reforms, such as eliminating prior authorization for MOUD and expanding telehealth reimbursement, could help close treatment gaps.⁵¹⁻⁵³

Strengths and Limitations

This study has notable strengths. Our study used recent national data and mapped COC progression among a large sample of youths to national quality measures, enabling alignment with performance benchmarks.^{15,17,19} We also engaged youths and family members with lived experience of OUD to inform the study design, variable selection, and interpretation of findings.

This study also has limitations. Administrative claims data are subject to misclassification and may not fully capture patient- or clinician-level factors that influence treatment engagement and retention. Some youths may have received an OUD diagnosis despite only limited or experimental opioid use, whereas others with OUD may not have been documented in claims.^{54,55} Furthermore, we investigated incident documented OUD diagnoses within the study window, which may not have represented an individual's first OUD diagnosis in claims. Additionally, addiction treatment that did not generate a Medicaid claim (eg, services paid out of pocket or otherwise not billed to Medicaid) was not captured. The requirement for 6 months or more of continuous Medicaid enrollment before and after the index diagnosis may introduce selection bias by excluding youths with unstable coverage, a subgroup likely to include individuals with greater social vulnerability, intermittent care access, and higher clinical risk. As a result, findings may overestimate rates of treatment initiation, engagement, and retention within the COC for OUD. Also, findings may not generalize to youths who are uninsured or have commercial insurance.

Conclusions

In this cohort study, most Medicaid-enrolled youths with OUD did not receive timely, evidence-based care, and sharp drop-offs existed across all COC stages. Racial and ethnic disparities were pervasive, and adolescents younger than 18 years were particularly unlikely to receive MOUD (especially methadone) and continue receiving it. Medicaid programs have a critical opportunity to improve youth addiction care by expanding access to pharmacotherapy, strengthening retention strategies, and embedding equity into quality improvement initiatives. Policies governing access to MOUD—such as prior authorization requirements, coverage of specific medications, prescriber restrictions, and reimbursement structures—vary substantially across states and are known to influence treatment access and retention but were outside the scope of our available data, warranting further study. Even within existing policy environments, clinicians, health systems, and policymakers have opportunities to optimize sustainable models of care that meet the developmental and cultural needs of youths with OUD. Addressing these challenges will be essential to reversing rising overdose mortality and supporting long-term recovery in these vulnerable and complex patient populations.

ARTICLE INFORMATION

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Author Contributions: Dr Hadland had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

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SUPPLEMENT 1.

eTable 1. The T-MSIS Analytic Files (TAF) analysis reporting checklist

eMethods. Further description of the development of the analytic sample

eFigure 1. Flowchart for development of the analytic sample

eTable 2. Age of diagnosis according to sex among 229 847 youth with opioid use disorder: Medicaid programs, 50 US states and Washington, DC, 2016-2023

eTable 3. The Cascade of Care for 229,847 youth with opioid use disorder according to sociodemographic and clinical characteristics: Medicaid programs, 50 US states and Washington, DC, 2016-2023

eFigure 2. Retention on medications for opioid use disorder among 35 011 youth engaged in treatment according to (A) age, (B) sex, (C) race and ethnicity: Medicaid programs, 50 US states and Washington, DC, 2016-2023

eFigure 3. Retention on buprenorphine among 23,990 youth according to year of opioid use disorder diagnosis: Medicaid programs, 50 US states and Washington, DC, 2016-2023

eFigure 4. Retention on methadone among 8,911 youth according to year of opioid use disorder diagnosis: Medicaid programs, 50 US states and Washington, DC, 2016-2023

eTable 4. Sensitivity analysis of 180-day retention on medications for opioid use disorder (MOUD) according to the duration of the MOUD gap used to define discontinuation among 35 011 youth: Medicaid programs, 50 US states and Washington, DC, 2016-2023

SUPPLEMENT 2.

Data Sharing Statement