Receipt of Timely Addiction Treatment and Association of Early Medication Treatment With Retention in Care Among Youths With Opioid Use Disorder

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 Supplemental content

IMPORTANCE Retention in addiction treatment is associated with reduced mortality for individuals with opioid use disorder (OUD). Although clinical trials support use of OUD medications among youths (adolescents and young adults), data on timely receipt of buprenorphine hydrochloride, naltrexone hydrochloride, and methadone hydrochloride and its association with retention in care in real-world treatment settings are lacking.

OBJECTIVES To identify the proportion of youths who received treatment for addiction after diagnosis and to determine whether timely receipt of OUD medications is associated with retention in care.

DESIGN, SETTING, AND PARTICIPANTS This retrospective cohort study used enrollment data and complete health insurance claims of 2.4 million youths aged 13 to 22 years from 11 states enrolled in Medicaid from January 1, 2014, to December 31, 2015. Data analysis was performed from August 1, 2017, to March 15, 2018.

EXPOSURES Receipt of OUD medication (buprenorphine, naltrexone, or methadone) within 3 months of diagnosis of OUD compared with receipt of behavioral health services alone.

MAIN OUTCOMES AND MEASURES Retention in care, with attrition defined as 60 days or more without any treatment-related claims.

RESULTS Among 4837 youths diagnosed with OUD, 2752 (56.9%) were female and 3677 (76.0%) were non-Hispanic white. Median age was 20 years (interquartile range [IQR], 19-21 years). Overall, 3654 youths (75.5%) received any treatment within 3 months of diagnosis of OUD. Most youths received only behavioral health services (2515 [52.0%]), with fewer receiving OUD medications (1139 [23.5%]). Only 34 of 728 adolescents younger than 18 years (4.7%; 95% CI, 3.1%-6.2%) and 1105 of 4109 young adults age 18 years or older (26.9%; 95% CI, 25.5%-28.2%) received timely OUD medications. Median retention in care among youths who received timely buprenorphine was 123 days (IQR, 33-434 days); naltrexone, 150 days (IQR, 50-670 days); and methadone, 324 days (IQR, 115-670 days) compared with 67 days (IQR, 14-206 days) among youths who received only behavioral health services. Timely receipt of buprenorphine (adjusted hazard ratio, 0.58; 95% CI, 0.52-0.64), naltrexone (adjusted hazard ratio, 0.54; 95% CI, 0.43-0.69), and methadone (adjusted hazard ratio, 0.32; 95% CI, 0.22-0.47) were each independently associated with lower attrition from treatment compared with receipt of behavioral health services alone.

CONCLUSIONS AND RELEVANCE Timely receipt of buprenorphine, naltrexone, or methadone was associated with greater retention in care among youths with OUD compared with behavioral treatment only. Strategies to address the underuse of evidence-based medications for youths with OUD are urgently needed.

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A s the United States confronts the opioid crisis, morbidity and mortality from opioids continue to increase among youths (adolescents and young adults). Deaths from overdose, hospitalizations for nonfatal overdose, and diagnoses of opioid use disorder (OUD) among youths have increased since the early 2000s.[1-4] Multiple major professional organizations and government bodies recommend providing youths of any age with effective treatment as early as possible, including use of OUD medications buprenorphine hydrochloride, naltrexone hydrochloride, or methadone hydrochloride.[5-8] Despite these evidence-based recommendations, youths are only one-tenth as likely as adults to receive medication for OUD,[1,9] likely owing to poor availability of pediatric prescribers, clinician discomfort with medications, and stigma surrounding medication treatment.[10,11] Even when youths receive medications for OUD, it is often only after clinicians have exhausted other nonpharmacologic treatment options, such as behavioral health services.[1,9,11]

Ensuring timely treatment with OUD medications may be especially important in light of data showing that adults who receive medications are more likely to be retained in addiction treatment.[12-14] Because living with addiction can be a lifelong process that involves cycles of relapse and recovery, maximizing retention in care is a central strategy in the pursuit of decreased mortality among individuals with OUD.[15,16] In longitudinal cohort studies of adults who have initiated OUD treatment, all-cause mortality when an individual is receiving treatment is less than half that observed after discontinuing treatment.[15] Because attrition from OUD treatment is greater for youths than it is for adults, strategies to prevent youths from leaving care are urgently needed.[17-20] Small randomized clinical trials have shown that, under experimental conditions, youths who receive medication treatment for OUD are more likely to be retained in treatment up to 12 weeks.[20-22] However, we know of no large studies with follow-up beyond this time frame or studies that have used data from real-world treatment settings.

Using an 11-state sample of youths with OUD enrolled in Medicaid, we sought to identify the frequency with which youths who presented to care for OUD received timely addiction treatment, including behavioral health services and/or OUD medications, and the association between timely receipt of OUD medications and subsequent retention in care. We hypothesized that timely receipt of buprenorphine, naltrexone, or methadone would be associated with longer retention in addiction treatment compared with behavioral treatment only.

Methods

Study Design and Sample

This retrospective cohort study was conducted using the 2014-2015 Truven-IBM Watson Health MarketScan Medicaid Database, which included data for 2 490 114 youths aged 13 to 22 years with at least 6 months of continuous enrollment and all associated inpatient, outpatient, emergency department, behavioral health, and retail prescription drug claims between

Key Points

Question What percentage of youths receive medications for opioid use disorder shortly after diagnosis, and are those who receive medications early after diagnosis more likely to remain in care compared with those who receive behavioral treatment only?

Findings In this multistate cohort of 4837 youths with opioid use disorder, 1 of 21 adolescents younger than 18 years and 1 of 4 young adults aged 18 to 22 years received medication for opioid use disorder within 3 months of diagnosis. Youths who received buprenorphine were 42% less likely to discontinue treatment, those who received naltrexone were 46% less likely to discontinue treatment, and those who received methadone were 68% less likely to discontinue treatment compared with youths who received behavioral treatment only.

Meaning Pharmacotherapy, a critical evidence-based intervention to address opioid use disorder, may be underused in youths with this disorder; those who receive medications shortly after diagnosis may be more likely to remain in care than youths who receive behavioral health services only.

January 1, 2014, and December 31, 2015. Data were collected from 11 deidentified states representing all census regions of the United States. As all data were deidentified and the study was not considered to be human participants research by the Boston University School of Medicine Institutional Review Board, approval and patient consent were waived.

To generate the study sample, the following eligibility criteria were applied to identify all youths initiating a new episode of care for OUD: (1) primary or secondary diagnosis of OUD using *International Classification of Diseases, Ninth Revision* (*ICD-9*) codes 304.0x (opioid-type dependence) and 304.7x (combinations of opioid-type drug with any other drug dependence) in at least 1 inpatient or emergency department claim or 2 outpatient claims[1,23]; (2) before diagnosis, a 60-day period without another OUD diagnosis or receipt of buprenorphine, methadone, or naltrexone[1,23,24]; and (3) at least 3 months of enrollment data after diagnosis (eFigure in the Supplement).[1,23] We defined the date of the first observed OUD diagnosis as the start of the episode of care. Data from the first observed episode of care for OUD were included in analyses; any subsequent episodes of care were excluded.

Variables

Timely addiction treatment was defined as receipt of behavioral health services and/or OUD medication (buprenorphine, naltrexone, or methadone) within 3 months of diagnosis of OUD. The 3-month window was selected based on prior research[1,23]; sensitivity analyses also examined receipt of addiction treatment within 1, 2, 6, 9, and 12 months of diagnosis. Behavioral health services were identified using claims for individual outpatient, group outpatient, intensive outpatient, partial hospitalization, residential, and inpatient treatment based on *Current Procedural Terminology* and Healthcare Common Procedure Coding System (HCPCS) codes (eTable 1 in the Supplement).[25,26] Receipt of each of the 3 OUD medications was identified as follows: buprenorphine, using

pharmacy claims that included a National Drug Code for sublingual buprenorphine or buprenorphine-naloxone[1,23]; naltrexone, using pharmacy claims that included a National Drug Code for oral or long-acting injectable naltrexone and using HCPCS code J2315 (naltrexone, depot form); and methadone, using HCPCS code H0020 (methadone administration and/or service)[27,28] (eTable 2 in the Supplement).[1]

Retention in care was defined as time from receipt of first addiction treatment (either behavioral health services or OUD medication) to time of treatment discontinuation. An individual was considered to have discontinued treatment if at least 60 days passed without a claim for behavioral health services or OUD medication. The date of treatment discontinuation was defined as the last date of any qualifying claim. Youths were censored if they disenrolled from their insurance plan.

Sociodemographic covariates included age at diagnosis, sex, race/ethnicity, and Medicaid eligibility (disability or income). Clinical covariates included (at the time of diagnosis or during the preceding 3 months) pregnancy, depression, anxiety disorder, attention-deficit/hyperactivity disorder, alcohol use disorder, other substance use disorder, acute pain condition, or chronic pain condition based on *ICD-9* diagnosis codes (eTable 3 in the Supplement).[29-32] Covariates were selected based on their established association with OUD and potential influences on treatment and retention in care.[1,5,6,9,33]

Statistical Analysis

Sociodemographic and clinical characteristics associated with receipt of any timely addiction treatment were identified using multivariable logistic regression. Among youths who received timely addiction treatment, a subsequent model examined characteristics associated with receipt of OUD medication (with or without behavioral health services) compared with receipt of behavioral health services alone. Multivariable models included all sociodemographic and clinical covariates. Characteristics of youths receiving each of the 3 OUD medications were compared using χ^2 tests or Fisher exact test.

The Kaplan-Meier method was used to measure retention in care among youths who received timely OUD medications compared with those who received only behavioral health services. Because the exposure of interest (timely receipt of OUD medication) was a subset of the outcome (ongoing receipt of behavioral health services and/or OUD medication), a separate Kaplan-Meier curve examined the outcome of retention in behavioral health services alone. Multivariable Cox proportional hazards regression was then used to identify the association of receiving timely OUD medications with retention in care. Some youths had an initial claim for addiction treatment but did not receive any subsequent services, which resulted in violation of the proportional hazards assumption of Cox regression.[34] The analysis was therefore limited to youths who had at least 1 subsequent claim after their initial claim; potential differences in sociodemographic and clinical characteristics between youths with and without subsequent claims were identified using multivariable logistic regression. Models examined retention in care in association with the initial OUD medication used (buprenorphine, naltrexone, methadone, or none) and were adjusted for receipt of higher levels of behavioral health care (intensive outpatient treatment, partial hospitalization, residential care, or inpatient care)[25] as well as all sociodemographic and clinical characteristics. Analyses were conducted using SAS, version 9.4 (SAS Institute Inc). All statistical tests were 2-sided and considered to be significant at $P < .05$.

Results

Sample

The study included data for 2 483 250 youths aged 13 to 22 years who were enrolled in Medicaid, among whom 4837 (0.2%) initiated a new episode of care for OUD and thus met criteria for inclusion in the sample. The median age at diagnosis was 20 years (interquartile range [IQR], 19-21 years), and the sample included 2752 females, 2085 males, and 3677 non-Hispanic white patients. Females comprised 67 of 165 youths aged 13 to 15 years (40.6%), 233 of 563 aged 16 and 17 years (41.4%), 1030 of 1846 aged 18 to 20 years (55.8%), and 1422 of 2263 aged 21 and 22 years (62.8%). Overall, 773 females (28.1%) were pregnant at the time of OUD diagnosis or in the preceding 3 months.

Timely Addiction Treatment

Overall, 3654 youths (75.5%) received any timely addiction treatment (**Table 1**). The percentage of youths receiving any treatment did not differ significantly between adolescents younger than 18 years (554 of 728 [76.1%]; 95% CI, 73.0%-79.2%) and young adults aged 18 years or older (3029 of 4109 [73.7%]; 95% CI, 72.4%-75.1%). Most of the 3654 youths receiving timely addiction treatment received behavioral health services (3238 [88.6%]) either alone or in combination with OUD medications. Of youths receiving any behavioral health services, 872 (26.9%) received intensive outpatient treatment or partial hospitalization and 1664 (51.4%) received residential or inpatient care. The remaining 702 (21.7%) received outpatient care only.

Only a minority of youths received timely buprenorphine, naltrexone, or methadone (1139 [23.5%]) (**Table 2**). Overall, 34 of 728 adolescents (4.7%; 95% CI, 3.1%-6.2%) received OUD medications compared with 1105 of 4109 young adults (26.9%; 95% CI, 25.5%-28.2%). Most of the 1139 youths who received medication also received concurrent behavioral health services (723 [63.5%]). Most youths who received an OUD medication received it within 1 month of diagnosis (eTable 4 in the Supplement).

Of the 1139 youths who received timely OUD medications, 936 (82.2%) received buprenorphine, 135 (11.9%) received naltrexone, and 68 (6.0%) received methadone (eTable 5 in the Supplement). Adolescents were more likely to receive naltrexone than were young adults (12 of 34 [35.3%] vs 123 of 1105 [11.1%]; $P < .001$ for group difference). No adolescents received methadone.

Retention in Care

The 3654 youths who received any treatment contributed 13 185 person-months of follow-up. Overall, 2575 youths (70.5%) dis-

Table 1. Receipt of Addiction Treatment Within 3 Months of Diagnosis Among 4837 Medicaid-Enrolled Youths With Opioid Use Disorder

Characteristic	Total, No.	Received Any Timely Treatment (n = 3654)[a]	
		No. (%)	Adjusted Odds Ratio (95% CI)[b]
Age at diagnosis, y			
21-22	2263	1550 (68.5)	1 [Reference]
18-20	1846	1479 (80.1)	1.09 (0.94-1.26)
16-17	563	432 (76.7)	1.24 (0.97-1.58)
13-15	165	122 (73.9)	0.68 (0.47-0.98)
Sex			
Male	2085	1590 (76.3)	1 [Reference]
Female	2752	2064 (75.0)	1.02 (0.87-1.18)
Race/ethnicity			
White non-Hispanic	3677	2876 (78.2)	1 [Reference]
Black non-Hispanic	388	242 (62.4)	0.51 (0.41-0.65)
Hispanic	55	41 (74.5)	0.83 (0.44-1.54)
Other	717	495 (69.0)	0.64 (0.54-0.77)
Eligible for Medicaid owing to disability			
No	4571	3510 (76.8)	1 [Reference]
Yes	266	144 (54.1)	0.41 (0.32-0.54)
Pregnancy[c]			
No	4064	3109 (76.5)	1 [Reference]
Yes	773	545 (70.5)	0.73 (0.60-0.88)
Depression[c]			
No	3227	2415 (74.8)	1 [Reference]
Yes	1610	1239 (77.0)	1.28 (1.08-1.51)
Anxiety disorder[c]			
No	3439	2616 (76.1)	1 [Reference]
Yes	1398	1038 (74.2)	0.84 (0.71-1.00)
Attention-deficit/ hyperactivity disorder[c]			
No	4244	3191 (75.2)	1 [Reference]
Yes	593	463 (78.1)	1.21 (0.97-1.53)
Alcohol use disorder[c]			
No	4138	3082 (74.5)	1 [Reference]
Yes	699	572 (81.8)	1.43 (1.15-1.78)
Other substance use disorder[c]			
No	2307	1740 (75.4)	1 [Reference]
Yes	2530	1914 (75.7)	0.94 (0.82-1.08)
Acute pain condition[c]			
No	3282	2505 (76.3)	1 [Reference]
Yes	1555	1149 (73.9)	1.16 (0.98-1.38)
Chronic pain condition[c]			
No	3253	2555 (78.5)	1 [Reference]
Yes	1584	1099 (69.4)	0.59 (0.50-0.69)

[a] Had a claim for either behavioral health services or medication for opioid use disorder within 3 months of diagnosis.

[b] Adjusted for all other covariates listed in the table.

[c] At or during the 3 months before receiving a diagnosis of opioid use disorder.

continued treatment (crude incidence density, 19.5 discontinuing events per 100 person-months). Youths who received timely OUD medications were more likely to be retained in any addiction treatment and more likely to be retained in behavioral health services (**Figure**).

Median retention in care among youths who received only behavioral health services was shorter (67 days; IQR, 14-206 days) than that among those who received timely buprenor-phine (123 days; IQR, 33-434 days), naltrexone (150 days; IQR, 50-670 days), or methadone (324 days; IQR, 115-670 days). Similarly, median duration of behavioral health services among youths who did not receive timely OUD medications was shorter (65 days; IQR, 13-204 days) than among those who received timely buprenorphine (108 days; IQR, 34-290 days), naltrexone (152 days; IQR, 55-670 days), or methadone (217 days; IQR, 41-354 days).

Table 2. Type of Addiction Care Received Within 3 Months of Diagnosis Among 3654 Medicaid-Enrolled Youths Who Received Any Treatment for OUD

| Characteristic | No./Total No. (%) | | Receipt of OUD Medication, Adjusted Odds Ratio (95% CI)[b] |
	Behavioral Health Services Only (n = 2515)	OUD Medication (n = 1139)[a]	
Age at diagnosis, y			
21-22	889/1550 (57.4)	661/1550 (42.6)	1 [Reference]
18-20	1035/1479 (70.0)	444/1479 (30.0)	0.78 (0.67-0.91)
16-17	402/432 (93.1)	30/432 (6.9)	0.16 (0.11-0.24)
13-15	118/122 (96.7)	4/122 (3.3)	0.08 (0.03-0.23)
Sex			
Male	1175/1590 (73.9)	415/1590 (26.1)	1 [Reference]
Female	1340/2064 (64.9)	724/2064 (35.1)	1.06 (0.90-1.26)
Race/ethnicity			
White non-Hispanic	1948/2876 (67.7)	928/2876 (32.3)	1 [Reference]
Black non-Hispanic	206/242 (85.1)	36/242 (14.9)	0.48 (0.33-0.70)
Hispanic	31/41 (75.6)	10/41 (24.4)	0.68 (0.32-1.45)
Other	330/495 (66.7)	165/495 (33.3)	1.01 (0.82-1.26)
Eligible for Medicaid owing to disability			
No	2391/3510 (68.1)	1119/3510 (31.9)	1 [Reference]
Yes	124/144 (86.1)	20/144 (13.9)	0.47 (0.28-0.77)
Pregnancy[c]			
No	2219/3109 (71.4)	890/3109 (28.6)	1 [Reference]
Yes	296/545 (54.3)	249/545 (45.7)	1.62 (1.31-2.00)
Depression[c]			
No	1562/2415 (64.7)	853/2415 (35.3)	1 [Reference]
Yes	953/1239 (76.9)	286/1239 (23.1)	0.81 (0.67-0.98)
Anxiety disorder[c]			
No	1733/2616 (66.2)	883/2616 (33.8)	1 [Reference]
Yes	782/1038 (75.3)	256/1038 (24.7)	0.89 (0.72-1.09)
Attention-deficit/ hyperactivity disorder[c]			
No	2135/3191 (66.9)	1056/3191 (33.1)	1 [Reference]
Yes	380/463 (82.1)	83/463 (17.9)	0.91 (0.69-1.21)
Alcohol use disorder[c]			
No	2020/3082 (65.5)	1062/3082 (34.5)	1 [Reference]
Yes	495/572 (86.5)	77/572 (13.5)	0.43 (0.33-0.56)
Other substance use disorder[c]			
No	1045/1740 (60.1)	695/1740 (39.9)	1 [Reference]
Yes	1470/1914 (76.8)	444/1914 (23.2)	0.60 (0.52-0.70)
Acute pain condition[c]			
No	1685/2505 (67.3)	820/2505 (32.7)	1 [Reference]
Yes	830/1149 (72.2)	319/1149 (27.8)	0.91 (0.74-1.10)
Chronic pain condition[c]			
No	1755/2555 (68.7)	800/2555 (31.3)	1 [Reference]
Yes	760/1099 (69.2)	339/1099 (30.8)	1.30 (1.07-1.59)

Abbreviation: OUD, opioid use disorder.

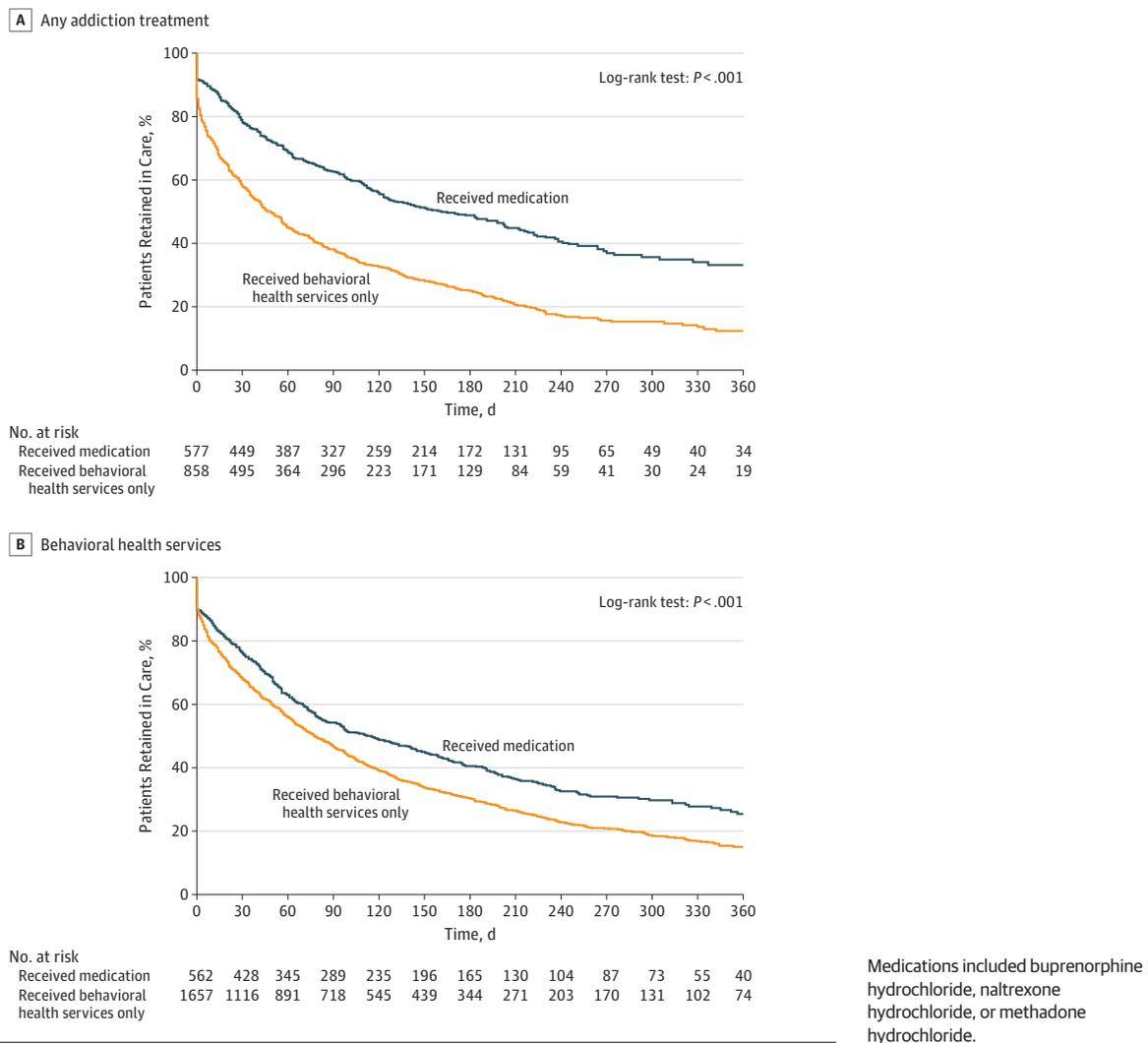[a] Includes youths who did and did not receive concurrent behavioral health services.

[b] Adjusted for all other covariates listed in the table.

[c] At or during the 3 months before receiving a diagnosis of opioid use disorder.

Of the 3654 youths who received any timely addiction treatment, 3247 (88.9%) met the criteria for inclusion in the Cox proportional hazards regression analysis of retention in care (ie, had at least 1 subsequent claim for behavioral health services or an OUD medication); the remaining 407 youths (11.1%) were excluded to satisfy the proportional hazards assumption of Cox proportional hazards regression. Included youths were more likely than excluded youths to be pregnant (adjusted odds ratio, 1.55; 95% CI, 1.10-2.18); have received intensive outpatient treatment, partial hospitalization, residential, or inpatient behavioral health services (adjusted odds ratio, 2.39; 95% CI, 1.86-3.08); have received buprenorphine (adjusted odds ratio, 1.35; 95% CI, 1.04-1.74); or have received methadone (adjusted odds ratio, 5.22; 95% CI, 1.26-21.53). Of included youths, 97 (3.0%) had claims for detoxification services. Of the 3238 youths who

Figure. Retention in Care According to Timely Receipt of Opioid Use Disorder Medication Within 3 Months
of Diagnosis Among Youths

A Any addiction treatment

B Behavioral health services

Medications included buprenorphine
hydrochloride, naltrexone
hydrochloride, or methadone
hydrochloride.

had an initial behavioral health claim, 2885 (89.1%) had a
subsequent claim.

Compared with youths who received only behavioral
health services, those who received timely buprenorphine were
42% (95% CI, 36%-48%) less likely to discontinue addiction
treatment, those who received timely naltrexone were 46%
(95% CI, 31%-57%) less likely to discontinue addiction treat-
ment, and those who received timely methadone were 68%
(95% CI, 53%-78%) less likely to discontinue addiction treat-
ment (Table 3). Compared with youths who received only be-
havioral health services, those who received timely buprenor-
phine were 27% (95% CI, 18%-36%) less likely to discontinue
behavioral health services, those who received timely naltrex-
one were 43% (95% CI, 27%-56%) less likely to discontinue be-
havioral health services, and those who received timely metha-
done were 53% (95% CI, 32%-67%) less likely to discontinue
behavioral health services (Table 3).

Discussion

In this multistate study of addiction treatment and retention
in care, we found that three-quarters of youths diagnosed with
OUD received treatment within 3 months. However, most treat-
ment included behavioral health services only, and fewer than
1 of 4 youths received timely buprenorphine, naltrexone, or
methadone treatment. A marked difference was observed by
age, with only 4.7% of adolescents receiving an OUD medica-
tion compared with 26.9% of young adults. Receipt of each of
the 3 OUD medications was independently associated with en-
hanced retention. Compared with youths who received only
behavioral health services, those receiving buprenorphine were
42% less likely to discontinue treatment during the follow-up
period, those receiving naltrexone were 46% less likely to dis-
continue treatment during the follow-up period, and those re-

Table 3. Retention in Care Among Youths With at Least 2 Claims for Addiction Treatment

Characteristic	Adjusted Hazard Ratio (95% CI)[a]	
	Attrition From Any Addiction Treatment (n = 3247)[b,c]	Attrition From Behavioral Health Services (n = 2885)[b]
Sociodemographic characteristics		
Age ≥21 y	1.63 (1.45-1.83)	1.59 (1.41-1.80)
Male	1.13 (1.03-1.24)	1.13 (1.02-1.24)
Non-Hispanic white	1.03 (0.93-1.14)	1.05 (0.94-1.18)
Eligible for Medicaid owing to disability	0.63 (0.49-0.80)	0.60 (0.46-0.78)
Clinical characteristics		
Pregnancy[d]	0.87 (0.75-0.99)	0.90 (0.77-1.04)
Comorbid behavioral health diagnosis[d,e]	1.04 (0.95-1.14)	1.01 (0.92-1.11)
Comorbid alcohol or other substance use disorder[d]	1.02 (0.93-1.12)	1.00 (0.91-1.10)
Acute or chronic pain condition[d]	0.92 (0.84-1.01)	0.92 (0.83-1.01)
Treatment received		
Higher level of behavioral health services within 3 mo of initiating episode of care[f]	0.94 (0.85-1.02)	0.92 (0.83-1.01)
Timely opioid use disorder medication within 3 mo of diagnosis		
No medication	1 [Reference]	1 [Reference]
Buprenorphine	0.58 (0.52-0.64)	0.73 (0.64-0.82)
Naltrexone	0.54 (0.43-0.69)	0.57 (0.44-0.73)
Methadone	0.32 (0.22-0.47)	0.47 (0.33-0.68)

[a] Multivariable models included all covariates listed in the table.

[b] Attrition defined as at least 60 days without any claims for services.

[c] Includes receipt of any behavioral health services or opioid use disorder medications.

[d] At or during the 3 months before receiving a diagnosis of opioid use disorder.

[e] Depression, anxiety, or attention-deficit/hyperactivity disorder.

[f] Includes intensive outpatient treatment, partial hospitalization, residential care, or inpatient care.

ceiving methadone were 68% less likely to discontinue treatment during the follow-up period.

Retention in care is critical to successful treatment of addiction and is increasingly being adopted as a quality measure.[26,35-40] In treatment protocols and clinical trials, eliminating or reducing substance use has traditionally been the primary end point.[41] However, increasing mortality from overdose and the recognition that addiction is a chronic, relapsing condition have prompted clinicians, researchers, and policy makers to increasingly focus on retention in care.[6,41] Even when patients do not reduce their substance use, individuals engaged and retained in care can receive harm-reduction services and treatment of comorbid medical and psychiatric conditions.[42-44] The advantage of this approach is supported by a recent, large meta-analysis, which found that, among adults, remaining in treatment is associated with substantially reduced all-cause mortality and mortality from overdose.[15]

Our findings reveal a critical gap in quality of care for youths, with only a minority who seek medical attention receiving the evidence-based OUD medications recommended by multiple national treatment guidelines.[5-8] Furthermore, this poor deployment of timely OUD medication may place youths at risk for early discontinuation of treatment. Our results build on the findings of the only 3 randomized clinical trials of OUD medications among youths conducted to date.[20-22] These randomized clinical trials showed improved treatment outcomes, including short-term enhanced retention in care, among youths who received buprenorphine under experimental conditions. We found that not only buprenorphine but also naltrexone and methadone, when provided in real-world treatment settings, were associated with enhanced retention in care compared with receipt of behavioral health services alone. Because clinical follow-up in randomized clinical trials of youths to date has ranged from only 28 days to 12 weeks,[20,21] our results also suggest that OUD medications may contribute to enhanced retention in care persisting beyond the time frames previously studied.

Strategies to enhance access to OUD medications for youths are urgently needed.[1,9,45] Our study sample included only youths who presented for medical attention, a group comprising only a minority of the true population of youths with OUD.[6] Youths encounter substantial barriers to accessing OUD medications, including insufficient pediatric prescribers, poor familiarity with medications among clinicians, systemic barriers to accessing methadone, and stigma surrounding medication use.[1,9-11] At many treatment programs, youths may be denied OUD medications owing to their younger age, or paradoxically, if they are receiving an OUD medication prescribed elsewhere, use of such medications may preclude entry into treatment.[11] As of January 2018, the Substance Abuse and Mental Health Services Administration Treatment Locator lists 1765 addiction treatment programs for adolescents or young adults, among which only 37% prescribe OUD medications, and of the remaining programs, 43% deny admission to youths receiving OUD medications prescribed elsewhere.[46] Our findings suggest that the practice of limiting access to OUD medications for youths may be detrimental for addiction treatment programs because receipt of medication is associated with enhanced retention in care.

We observed differences by race in access to OUD medications. In 1 recent study of youths with private health insurance, black youths were 42% less likely to receive buprenorphine or naltrexone for OUD compared with white youths,[1] which is consistent with our finding that black youths were 49% less likely to receive OUD medications. More important, we did not observe any differences in retention in care according to race after controlling for receipt of medications. Therefore, amid national efforts to expand access to evidence-based treatment, it is crucial that policy makers address the national treatment gap in a way that improves, rather than exacerbates, the disparities that we observed.

Limitations

There are several limitations to this study. First, owing to the observational nature of our study, we are unable to conclusively determine whether the enhanced retention in care that we observed was attributable to the OUD medications themselves or to the clinical systems in which they were provided.

For example, methadone is typically administered in a setting with strict rules and regulations that may promote greater adherence for patients who receive such treatment.[47] Similarly, provision of evidence-based medications such as buprenorphine or naltrexone could be more common in treatment centers with higher-quality standards.[38,39] Second, we found that receipt of behavioral health services alone was associated with poorer retention in care than was treatment with OUD medication, but the behavioral health services that we included were diverse. Although we adjusted for level of care, we cannot exclude the possibility that some behavioral health services may have been highly effective but were categorized with less effective behavioral health services.

Third, although we adjusted for sociodemographic and clinical characteristics of youths, we cannot exclude the potential influence of unmeasured confounders. In particular, given the administrative nature of the data, we were unable to adjust for severity of OUD, and youths with more severe OUD may have been more likely to receive medication as well as added resources to maximize retention. Fourth, we were unable to identify buprenorphine used in detoxification settings, which when rapidly tapered, may be associated with poorer retention in care compared with longer-term buprenorphine maintenance treatment.[20] Because only 3.0% of youths (97 of 3247) in the study sample received detoxification services, this potential limitation is unlikely to have had a substantial association with the effect sizes that we observed.

Conclusions

To our knowledge, this is the first large study to examine receipt of each of the 3 evidence-based OUD medications among youths. We are also unaware of other large studies that have examined retention in care in association with timely OUD medication treatment for youths. The finding that medications were provided to only approximately 1 of 4 youths presenting for care overall, including only 1 of 21 adolescents, highlights a crucial potential opportunity to improve OUD care and enhance retention in treatment. As deaths from overdose increase among US youths, it is vital that clinicians, researchers, and policy makers ensure that access to evidence-based OUD medications for young people remains a national priority.

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