Predicting Receipt of Substance Use Disorder Treatment Among Medicaid Clients

SUPPORT ACT §1003 Roadmap to Recovery Planning Grant

Katie Bittinger, PhD • Taylor Danielson, PhD • Barbara Lucenko, PhD
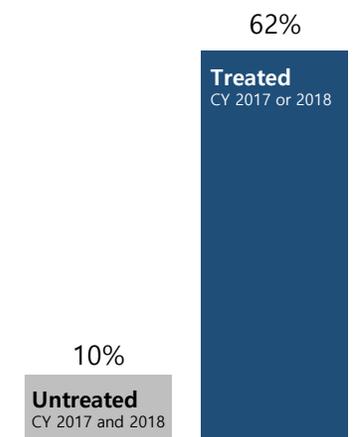Ross McCool, MS • Barbara Felver, MES, MPA

I N SEPTEMBER 2019, the Centers for Medicare and Medicaid Services (CMS) awarded the Washington State Health Care Authority (HCA) a Phase 1 Planning Grant under the §1003 SUPPORT ACT to develop a strategy for improving substance use disorder treatment and recovery services.[1] This report describes the results of statistical analyses predicting Washington State Medicaid clients' receipt of substance use disorder (SUD) treatment services in calendar year (CY) 2019 based on client characteristics and health histories, prior involvement with state systems, and contextual factors. The aim of this analysis was to identify factors associated with receipt of three SUD treatment modalities (outpatient, inpatient, and medication for opioid use disorders) and to identify disparities in treatment participation.

Key Findings

1. **Prior receipt of SUD treatment services strongly predicts future treatment.** CY 2019 treatment rates were six times higher among clients treated for SUD in CY 2017 or 2018 compared to previously untreated clients (*see* Figure 1). Multivariate analyses indicated that past receipt of outpatient, inpatient, and MOUD treatment in 2018 strongly predicted receipt of these same services in CY 2019.

2. **Of those Medicaid clients who did not receive SUD treatment in 2017 or 2018, the following subpopulations were less likely on average to receive treatment in 2019 relative to the reference group: women, adults 55 and older, and persons of color other than those of American Indian/Alaskan Native heritage.**

3. **Contact with emergency departments (EDs), child protective services, and the criminal legal system are associated with greater uptake of SUD treatment services.** Additional research is required to understand the mechanisms underlying these relationships and how clients connected to SUD treatment through these systems fare relative to those connected to SUD treatment through other avenues (e.g., local behavioral health providers).

FIGURE 1.

Receipt of Any SUD Treatment Service Among Medicaid Clients with an Indicated SUD
By Prior Treatment Status, CY 2019

62%
Treated CY 2017 or 2018

10%
Untreated CY 2017 and 2018

Washington State
Department of Social & Health Services
Transforming lives

Data and Methods

Study Population and Analytic Approach

The initial study population included Medicaid recipients ages 18 to 64 who were not dually enrolled in Medicare or third-party liability coverage, had an indicated substance use disorder (SUD), received any form of medical assistance in December 2018, and had Title XIX Medicaid coverage for 11 out of 12 months in both of the calendar years 2018 (the intake period) and 2019 (the outcome period).

This population was further restricted to individuals for whom sufficient geographic information was available. The final study population included 93,253 Medicaid recipients with an SUD (hereafter referred to as "clients"). We used binary logistic regression models to estimate the effect of a variety of factors on SUD treatment uptake. These include:

- The presence of co-occurring mental health conditions;
- Prior receipt of mental health treatment services;
- Prior receipt of SUD outpatient, inpatient, medication, assessment, or withdrawal management services;
- SUD diagnoses;
- Contact with the criminal legal system;
- Housing status;
- Employment history;
- Chronic illness risk score; and
- Receipt of inpatient and outpatient treatment in a hospital setting.

Additional measures (e.g., client demographics) were included to identify disparities in treatment receipt after controlling for the variables listed above. A comprehensive list of the independent variables included in these models and their estimated effects are available in Appendix Tables A1 and A2. Information on how these measures were constructed is provided in the Technical Notes.

To distinguish between predictors associated with initiation of SUD treatment versus ongoing[2] treatment, we divided our study population into two analytic subgroups: those who had received any form of SUD treatment service in CY 2017 or CY 2018, either as part of ongoing treatment or in the form of an isolated treatment event (n = 41,673); and those who had not received any SUD treatment services during this period (n = 51,580).

We then further subdivided the analyses by treatment modality (outpatient, inpatient, and medication for opioid use disorders [MOUD]).[3] Because MOUD treatment targets individuals with a diagnosed opioid use disorder (OUD), we limited all analyses of MOUD treatment to the 36,314 Medicaid clients diagnosed with an OUD in 2017 or 2018. Of these 36,314 clients, 25,543 had received any SUD treatment in 2017 or 2018, while 10,771 had not.

In total, we estimated six different models to determine which predictors affect the probability that a client will initiate or continue in one of the treatment modalities of interest. Given the considerable number of covariates included in our models, we focus our attention on statistically significant predictors that represent potential areas of system improvement and/or are associated with multiple outcomes.

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[2] Ongoing treatment in this context means having treatment in both the intake and outcome periods and does not necessarily indicate that an individual is receiving consistent treatment, or all treatments, recommended by a medical professional.

[3] MOUD includes buprenorphine, buprenorphine-naloxone, naltrexone, or opiate substitution treatment (methadone) for treatment of OUD.

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Results

Descriptive Statistics

Client Characteristics. Most clients (73 percent) were between the ages of 25 to 54, and 30 percent were ages 25 to 34 (*see* Figure 2). Slightly more than half (51 percent) were female. Roughly two-thirds of clients were white, non-Hispanic; the next largest groups were American Indian or Alaskan Native, followed by Hispanic or Latino, Black or African American, Asian, and Native Hawaiian or Pacific Islander (NHOPI).

FIGURE 2.

Client Characteristics as of December 31, 2018
FULL SAMPLE, TOTAL = 93,253 Medicaid Clients with SUD
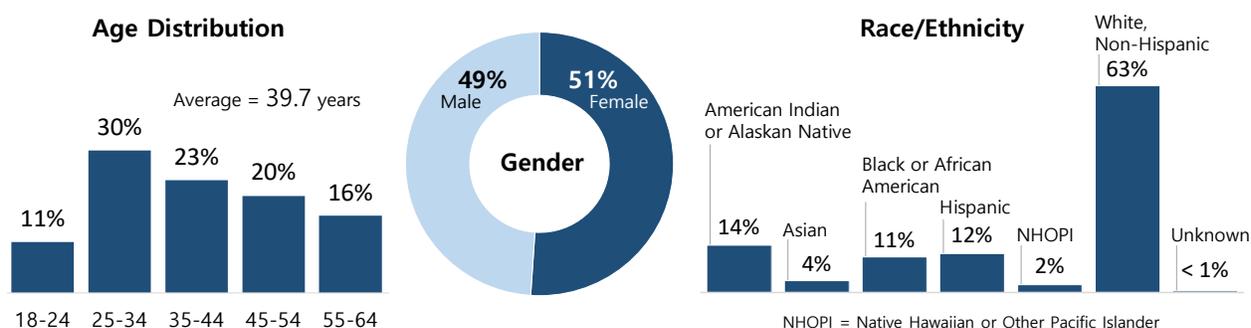
The study population was almost evenly split between those who had received SUD treatment in calendar years 2017 or 2018 (n = 41,673; 45 percent) and those who had not (n = 51,580; 55 percent). Comparisons of previously untreated clients to those who had previously received treatment, shown in Figures 3A and 3B, highlight several key differences between these two groups.

- Previously treated clients were more likely than untreated clients to be between the ages of 25 and 44 (63 percent vs. 46 percent); American Indian or Alaskan Native (17 percent vs. 13 percent); and male (50 percent vs. 48 percent).

- Previously treated clients were less likely than untreated clients to be young adults ages 18 to 24 (9 percent vs. 12 percent), older adults between the ages of 45 and 64 (29 percent vs. 42 percent), or Black or African American (9 percent vs. 12 percent).

FIGURE 3.

Client Characteristics by Prior Treatment Status
A. UNTREATED CLIENTS, n = 51,580 Medicaid Clients with SUD
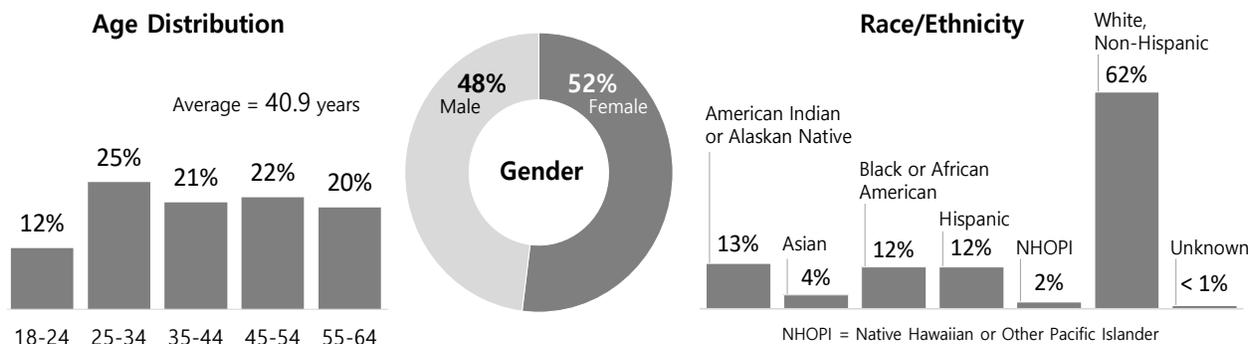
B. PREVIOUSLY TREATED CLIENTS, n = 41,673 Medicaid Clients with SUD

Age Distribution

Average = 38.1 years

18-24: 9%
25-34: 36%
35-44: 27%
45-54: 18%
55-64: 11%

Gender

50% Male
50% Female

Race/Ethnicity

American Indian or Alaskan Native: 17%
Asian: 3%
Black or African American: 9%
Hispanic: 11%
NHOPI: 3%
White, Non-Hispanic: 63%
Unknown: < 0%

NHOPI = Native Hawaiian or Other Pacific Islander
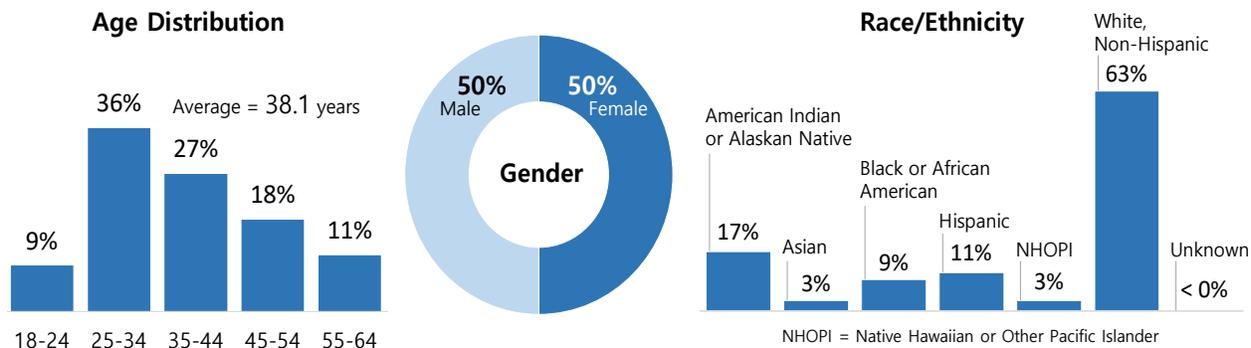
Substance Use Disorder Diagnoses. As shown in Figure 4, alcohol use (40 percent), cannabis (38 percent), and opioid use (39 percent) disorders were similarly prevalent for the entire population of interest, followed closely by stimulant use disorders (36 percent). Other SUD diagnoses (e.g., inhalants, hallucinogens, or other psychoactive substances) were also relatively common (28 percent). Almost half (48 percent) of clients had two or more different SUD diagnoses.

FIGURE 4.

Prevalence of Specific Substance Use Disorders by Prior Treatment Status

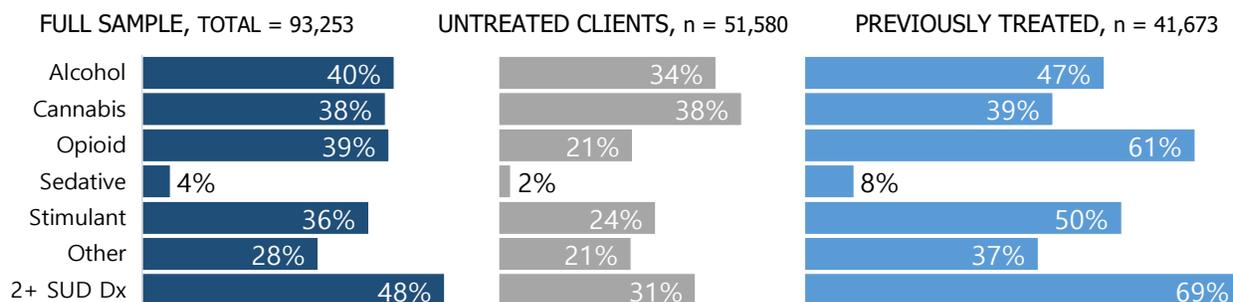|	FULL SAMPLE, TOTAL = 93,253	UNTREATED CLIENTS, n = 51,580	PREVIOUSLY TREATED, n = 41,673
Alcohol	40%	34%	47%
Cannabis	38%	38%	39%
Opioid	39%	21%	61%
Sedative	4%	2%	8%
Stimulant	36%	24%	50%
Other	28%	21%	37%
2+ SUD Dx	48%	31%	69%

Clients previously treated for SUD were more than two times as likely to be diagnosed with two or more SUD diagnoses (69 percent vs. 31 percent), resulting in much higher diagnosis rates for all SUD types shown in Figure 4 except cannabis use disorders. After accounting for the presence of multiple SUD diagnoses (not shown here), we observed several key differences between individuals who had and those who had not received any SUD treatment.

First, among clients with only one SUD diagnosis, previously treated clients were *less* likely to be diagnosed with a cannabis use disorder (7 percent vs. 29 percent) or other drug use disorder (1 percent vs. 7 percent) and *more* likely to be diagnosed with an OUD (41 percent vs. 15 percent) compared to clients who had not previously received treatment in 2017 or 2018.

Second, among clients with two or more SUD diagnoses, previously treated clients were: 1) diagnosed with more substance use disorders on average (3.1 vs. 2.5); 2) more likely to have three or more SUD diagnoses (63 percent vs. 35 percent); and 3) more likely to be diagnosed with an opioid (71 percent vs. 35 percent), stimulant (68 percent vs. 54 percent) or alcohol use disorder (53 percent vs. 43 percent) relative to untreated clients.

Receipt of SUD Treatment in 2019. Thirty-four percent of clients received SUD treatment in CY 2019. Roughly one in five received at least one outpatient treatment service and six percent had at least one stay in an inpatient treatment facility. Of those with a diagnosed OUD, slightly more than half received MOUD treatment.

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FIGURE 5.

Receipt of SUD Treatment Services in CY 2019 by Prior Treatment Status
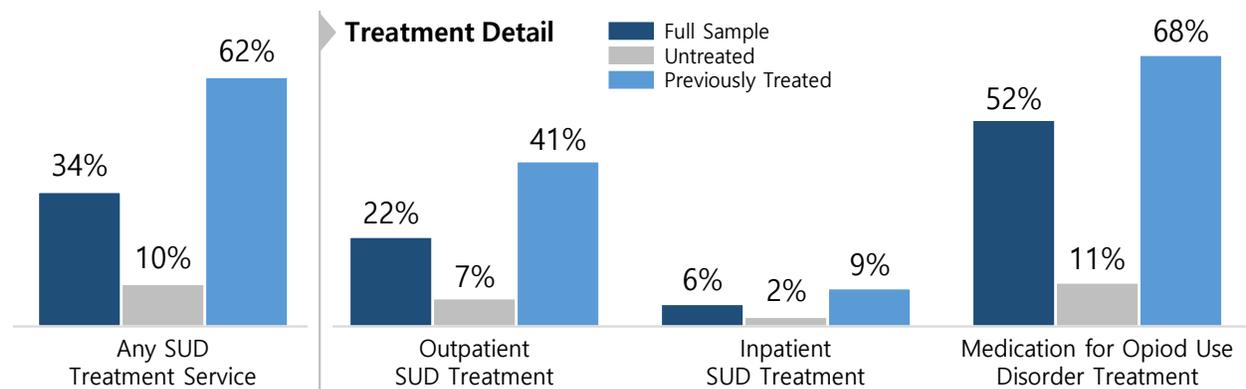
Results for MOUD treatment are restricted to clients with an opioid use disorder diagnosis in 2017 or 2018.

Figure 5 shows treatment rates in CY 2019 were substantially higher among clients who received treatment in CY 2017 or 2018. Sixty-two percent of previously treated clients received any SUD treatment in 2019 compared to 10 percent of untreated clients. These differences in treatment rates persist across all three treatment modalities examined here. Previously treated clients were roughly six times as likely to receive at least one outpatient service, four times as likely to receive inpatient residential treatment, and, among those with an OUD diagnosis, six times as likely to receive MOUD treatment in 2019.

Predictive Models: Clients without Recent SUD Treatment History

The following sections summarize the results of statistical models focusing on clients who had not received SUD treatment in the two years prior to CY 2019 (n = 51,580). We also focus on disparities in 2019 treatment rates associated with demographics, geography, and involvement with other state and local systems (e.g., emergency department utilization, criminal legal system, child welfare, etc.). Figures 6 through 11 highlight those factors significantly associated with two or more of the outcomes examined here and/or suggest potential disparities in treatment access. A more exhaustive list of factors and their associated effect sizes is available in Appendix Table A1.

Demographics and Household Characteristics. As shown in Figure 6, several demographic factors were modestly associated with the odds of receiving SUD treatment in 2019. Controlling for other factors, previously untreated clients ages 25 to 34 were 1.16 and 1.34 times as likely receive outpatient or inpatient SUD treatment relative their 18- to 24-year-old peers, while older clients ages 45 to 54 (OR_{OP} =0.80; OR_{MOUD} = 0.68) and 55 to 64 (OR_{OP} =0.64; OR_{MOUD} = 0.61) were less likely to receive outpatient or MOUD treatment services. Relative to white, non-Hispanic clients:

- American Indian and Alaskan Native clients were slightly more likely to receive outpatient, inpatient, and MOUD treatments;
- Black or African American clients with a diagnosed OUD were less likely to receive MOUD treatment (*see* Table A1 in the Appendix);
- Asian clients were less likely to receive inpatient or MOUD treatment; and
- Hispanic clients were less likely to receive inpatient treatment (*see* Table A1 in the Appendix).

Women who were not pregnant in 2018 were less likely to access outpatient and inpatient treatment services in 2019 compared to men, while pregnant women were more likely to receive outpatient treatment and—among those with a diagnosed OUD—less likely to receive MOUD. Residing in a household with two or more adults was associated with a reduced likelihood of receiving any of the three treatment modalities examined here. Veterans were less likely to receive both outpatient and MOUD treatment than non-veteran clients.

FIGURE 6.

Demographic Factors Associated with SUD Treatment, by Modality
UNTREATED CLIENTS

Lower Odds OF RECEIVING TREATMENT	AXIS = 1 Equal Odds	Higher Odds OF RECEIVING TREATMENT

OUTPATIENT TREATMENT (OP)

Female, Pregnant	**1.16**
Age: 25-34	**1.16**
American Indian/Alaska Native	**1.13**
0.94	Asian
0.86	Female, Not Pregnant
0.83	2+ Adults in Household
0.80	Age: 45-54
0.75	Veteran
0.64	Age: 55-64

INPATIENT RESIDENTIAL TREATMENT (IP)

Age: 25-34	**1.34**
American Indian/Alaska Native	**1.19**
0.98	Age: 45-54
0.88	Female, Pregnant
0.85	Veteran
0.82	Age: 55-64
0.78	Female, Not Pregnant
0.75	Asian
0.73	2+ Adults in Household

MEDICATION TREATMENT FOR OPIOID USE DISORDERS (MOUD)

American Indian/Alaska Native	**1.22**
Female, Not Pregnant	1.10
Age: 25-34	1.01
0.73	2+ Adults in Household
0.68	Age: 45-54
0.68	Female, Pregnant
0.65	Asian
0.61	Age: 55-64
0.46	Veteran

NOTE: BOLD font indicates statistically significant odds ratios (OR)s. Model results for MOUD treatment are restricted to clients with an opioid use disorder diagnosis in 2017 or 2018.

Medicaid Coverage, Pre-Existing Medical Conditions, and Prior Medical Care. Previous emergency department (ED) visits were associated with higher rates of treatment receipt in CY 2019 relative to no ED visits (*see* Figure 7).[4] This relationship was strongest for SUD inpatient treatment: compared to individuals who did not visit an ED in 2018, previously untreated individuals who visited the ED one, two, or three or more times were, respectively, 1.72, 1.86, and 2.41 times as likely to receive inpatient SUD treatment in 2019.

In contrast to ED visits, previously untreated clients who received non-ED hospital outpatient services (e.g., dialysis) one time in 2018 were less likely to receive inpatient and MOUD treatment after controlling for other factors in the model, and clients who received non-ED outpatient treatment three or more times in 2018 were less likely to receive outpatient, inpatient, and MOUD treatment. Clients with a high chronic illness risk score[5] indicating that they had significant healthcare needs were more

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[4] Net of the effect of overdose events on treatment receipt, which is also included as a covariate in these models and was found to be positively associated with the probability of receiving MOUD treatment services in CY 2019.

[5] This summary measure is calculated using demographic, diagnostic, and prescription information taken from Medicaid claims data. Scores represent the future anticipated medical costs of a given client relative to the average disabled Medicaid client. The anticipated medical costs for these clients were 2 to 4.99 times more than the average disabled Medicaid client in CY 2019.

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likely to receive SUD inpatient treatment—but less likely to receive MOUD and outpatient treatment—than clients with less complex care needs.[6]

FIGURE 7.

Healthcare Factors Associated with SUD Treatment Receipt, by Modality
UNTREATED CLIENTS

Lower Odds
OF RECEIVING TREATMENT

AXIS = 1
Equal Odds

Higher Odds
OF RECEIVING TREATMENT

OUTPATIENT TREATMENT
(OP)

Three or More ED Visits	1.48
Two ED Visits	1.43
One ED Visit	1.28
0.89	Chronic Illness Risk Score 2.00 to 4.99
0.88	One Non-ED Hospital Visit
0.67	Three or More Non-ED Hospital Visits

INPATIENT RESIDENTIAL TREATMENT
(IP)

Three or More ED Visits	2.41
Two ED Visits	1.86
One ED Visit	1.72
Chronic Illness Risk Score 2.00 to 4.99	1.25
0.80	One Non-ED Hospital Visit
0.60	Three or More Non-ED Hospital Visits

MEDICATION TREATMENT FOR OPIOID USE DISORDERS
(MOUD)

Three or More ED Visits	2.12
One ED Visit	1.57
Two ED Visits	1.46
0.77	One Non-ED Visit
0.74	Chronic Illness Risk Score 2.00 to 4.99
0.54	Three or More Non-ED Visits

NOTE: BOLD font indicates statistically significant odds ratios (OR)s. Model results for MOUD treatment are restricted to clients with an opioid use disorder diagnosis in 2017 or 2018.

SUD Diagnoses and Co-occurring Mental Health Disorders. The probability of receiving SUD treatment varied by substance type (*see* Figure 8). Controlling for other factors in the model, previously untreated Medicaid clients diagnosed with an alcohol use disorder (AUD) were 1.70 times as likely to receive outpatient treatment and 2.32 times as likely to receive inpatient treatment than clients without an AUD diagnosis. Opioid (OR_{OP} = 1.53; OR_{IP} = 1.41), stimulant (OR_{OP} = 1.59; OR_{IP} = 1.82), and other drug (OR_{OP} = 1.36; OR_{IP} =1.50) use disorder diagnoses were also associated with modest increases in the odds of receiving outpatient and inpatient treatment. A cannabis use disorder diagnosis was associated with a reduced odds of receiving outpatient and inpatient treatment, and clients with an OUD and cannabis use disorder diagnosis were less likely (OR_{MOUD} = 0.82) to receive MOUD in 2019. Conversely, clients with an OUD and other drug use disorder diagnosis were slightly more likely (OR_{MOUD} = 1.27) to receive MOUD treatment relative to clients with a diagnosed OUD not diagnosed with some other drug use disorder. Among clients previously untreated for SUD, evidence of a co-occurring mental health (MH) disorder[7] was associated with an increased odds of receiving outpatient and inpatient treatment.[8] The estimated effect size varied by the acuity of a client's mental

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[6] Use of medication to treat opioid use disorder may be contraindicated for clients with more complex care needs due to potential interactions with medications they may be taking for other conditions.

[7] Additional analyses (not shown here) indicated that the inclusion of specific mental health disorder diagnoses in addition to the broad categorizations presented here did not appreciably improve our ability to predict SUD treatment in CY 2019. Consequently, we opted to include only the broader categories discussed above in our final model specification.

[8] This may reflect the transition of clients from evaluation and treatment settings to inpatient treatment facilities after it has been determined that the client's symptoms are at least partially attributable to an SUD. For example, individuals using methamphetamines or other stimulants may exhibit behaviors resembling symptoms of psychotic or mania and bipolar disorders. Once an individual has metabolized the substance in question, these symptoms will lessen and indicate that the client may need more intensive, inpatient care for their SUD.

health disorder and whether they had received any outpatient MH treatment in CY 2018. Clients with an OUD and co-occurring non-SMI MH disorder who had received outpatient MH treatment in 2018 were less likely to receive MOUD treatment in 2019.

FIGURE 8.
Behavioral Health Factors Associated with SUD Treatment Receipt, by Modality
UNTREATED CLIENTS

Lower Odds OF RECEIVING TREATMENT   AXIS = 1 / Equal Odds   **Higher Odds** OF RECEIVING TREATMENT

OUTPATIENT TREATMENT (OP)

Factor	OR
SMI: Treated	1.72
Alcohol	1.70
SMI: Untreated	1.59
Stimulant	1.59
Opioid	1.53
Other Drug	1.36
MH Disorder (non-SMI): Untreated	1.35
MH Disorder (non-SMI): Treated	1.17
Cannabis	0.84

INPATIENT RESIDENTIAL TREATMENT (IP)

Factor	OR
Alcohol	2.32
SMI: Untreated	1.86
Stimulant	1.82
SMI: Treated	1.80
MH Disorder (non-SMI): Untreated	1.65
MH Disorder (non-SMI): Treated	1.61
Other Drug	1.50
Opioid	1.41
Cannabis	0.73

MEDICATION TREATMENT FOR OPIOID USE DISORDERS (MOUD)

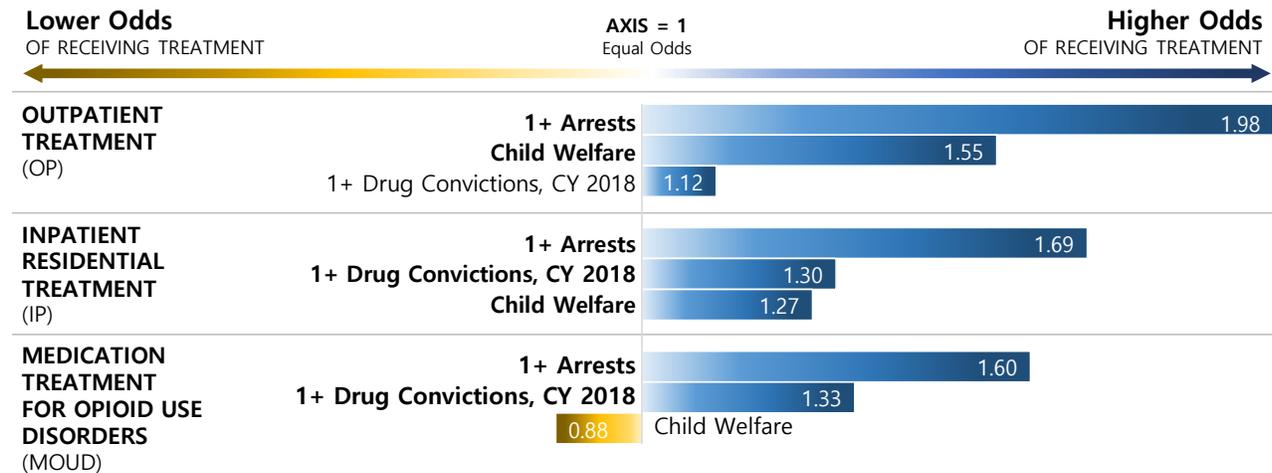| Factor	OR
Other Drug	1.27
MH Disorder (non-SMI): Untreated	1.14
Stimulant	1.07
SMI: Untreated	1.02
Opioid	N/A
Alcohol	0.95
SMI: Treated	0.95
Cannabis	0.82
MH Disorder (non-SMI): Treated	0.78

NOTE: BOLD font indicates statistically significant odds ratios (OR)s. Model results for MOUD treatment are restricted to clients with an opioid use disorder diagnosis in 2017 or 2018.

Contact with Public Systems. Receipt of cash or food assistance—as well as several other services provided by the Department of Social and Health Services—was inconsistently associated with receipt of SUD treatment. Conversely, contact with potentially punitive public systems was associated with an increased odds of receiving SUD treatment (*see* Figure 9 and Table A1 in the Appendix). Among those individuals who had not been previously treated for an SUD, involvement with the child welfare system (OR_{OP} = 1.55) and being arrested in 2018 (OR_{OP} = 1.98; OR_{IP} = 1.69; OR_{MOUD} = 1.60) were associated with a roughly 1.5 to 2.0-fold increase in the odds of receiving SUD treatment. Factors associated with a modest, 1.25- to 1.5-fold increase in the odds of receiving SUD treatment included child welfare involvement (OR_{IP} = 1.27) and being convicted of a drug-related crime (OR_{IP} = 1.30; OR_{MOUD} = 1.33).

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FIGURE 9.

Contact with Public Systems Associated with SUD Treatment Receipt, by Modality
UNTREATED CLIENTS

Lower Odds OF RECEIVING TREATMENT — AXIS = 1 Equal Odds — **Higher Odds** OF RECEIVING TREATMENT

OUTPATIENT TREATMENT (OP)
- **1+ Arrests** — 1.98
- **Child Welfare** — 1.55
- 1+ Drug Convictions, CY 2018 — 1.12

INPATIENT RESIDENTIAL TREATMENT (IP)
- **1+ Arrests** — 1.69
- **1+ Drug Convictions, CY 2018** — 1.30
- **Child Welfare** — 1.27

MEDICATION TREATMENT FOR OPIOID USE DISORDERS (MOUD)
- **1+ Arrests** — 1.60
- **1+ Drug Convictions, CY 2018** — 1.33
- 0.88 Child Welfare

NOTE: BOLD font indicates statistically significant odds ratios (OR)s. Model results for MOUD treatment are restricted to clients with an opioid use disorder diagnosis in 2017 or 2018.

Socioeconomic Factors. Previously untreated clients who were unhoused in CY 2018 were 1.43 to 1.61 times as likely as their housed peers to receive any of the three SUD treatment modalities examined here. Percentage of quarters employed since age 14 was positively associated with both outpatient and inpatient treatment during CY 2019.

FIGURE 10.

Socioeconomic Factors Associated with SUD Treatment Receipt, by Modality
UNTREATED CLIENTS

Lower Odds OF RECEIVING TREATMENT — AXIS = 1 Equal Odds — **Higher Odds** OF RECEIVING TREATMENT

OUTPATIENT TREATMENT (OP)
- **Homeless (2018)** — 1.43
- **Percent Quarters Employed** — 1.35

INPATIENT RESIDENTIAL TREATMENT (IP)
- **Percent Quarters Employed** — 1.60
- **Homeless (2018)** — 1.38

MEDICATION TREATMENT FOR OPIOID USE DISORDERS (MOUD)
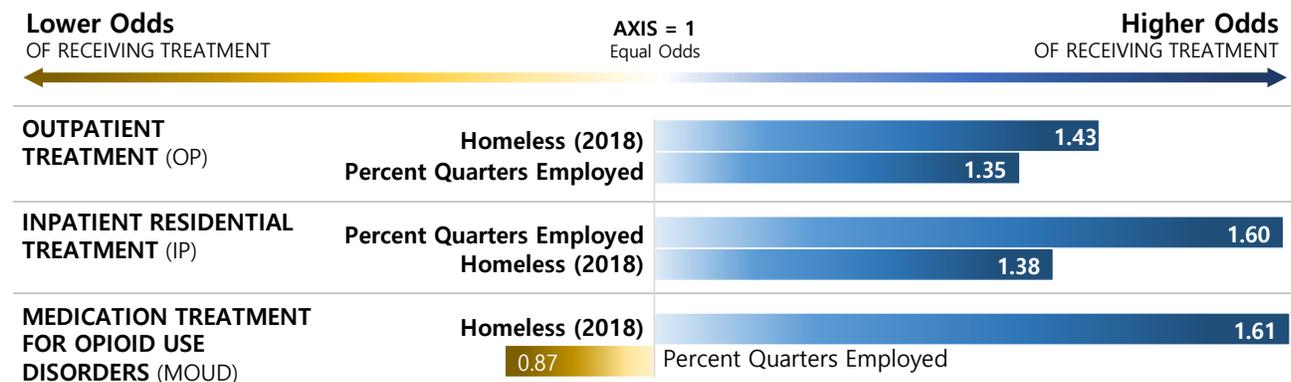- **Homeless (2018)** — 1.61
- 0.87 Percent Quarters Employed

NOTE: BOLD font indicates statistically significant odds ratios (OR)s. Model results for MOUD treatment are restricted to clients with an opioid use disorder diagnosis in 2017 or 2018.

Regional Factors. While several of the contextual factors included in our models did not consistently predict SUD treatment receipt, we did find evidence of regional variations in treatment rates across accountable communities of health (ACHs).[9] Long-term residence[10] in the counties associated with Better Health Together, Elevate Health, North Sound, and the Southwestern ACH (SWACH) was

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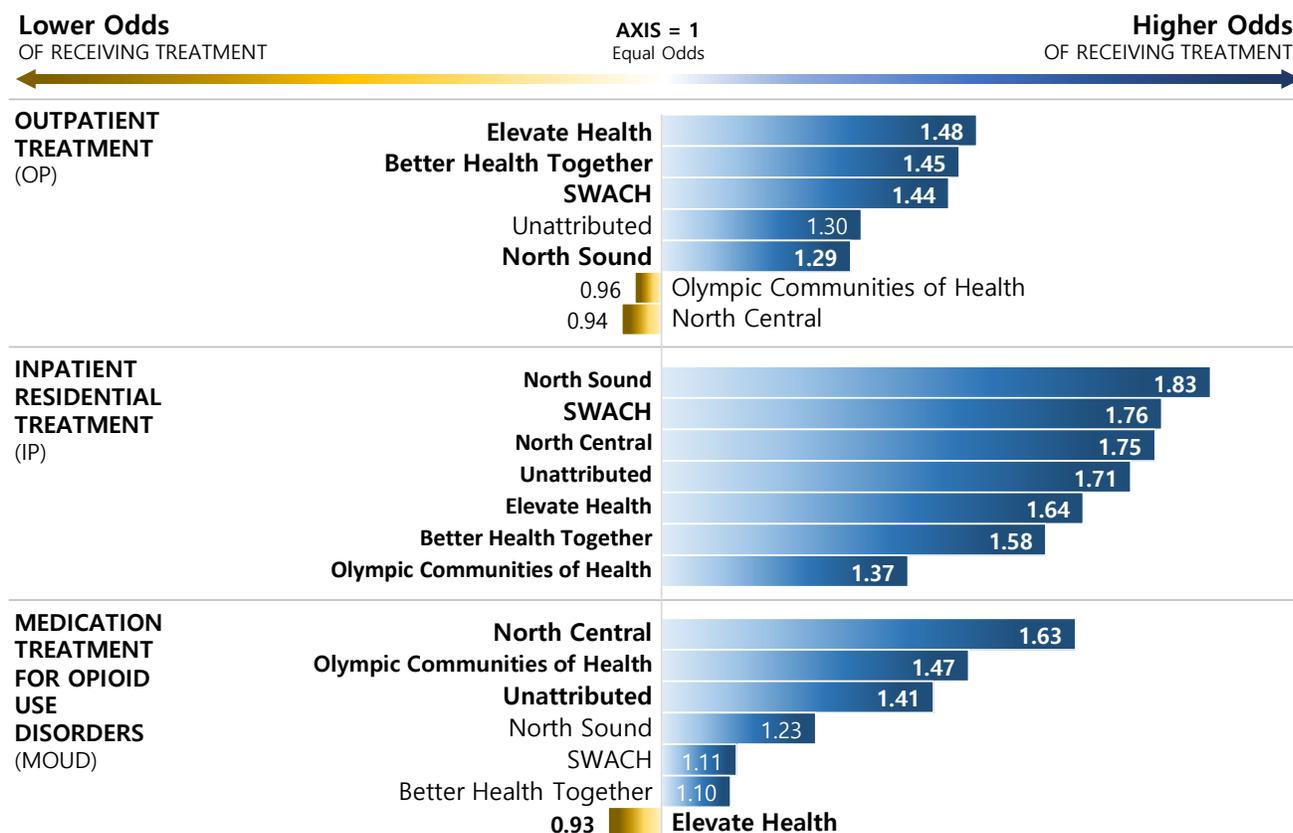[9] ACHs are regional self-governing organizations with a multidisciplinary focus on improving health outcomes and transforming delivery systems for individuals living in their region.

[10] Defined here as having a residential address associated with an ACH for 11 out of 12 months in CY 2018. Clients who resided in an ACH's catchment area for two to ten months were assigned to the "Unattributed" category.

associated with an increased odds of receiving outpatient and inpatient treatment compared to clients living in King County (i.e., HealthierHere ACH). Additionally, clients unattributed to an ACH or residing in the North Central or Olympic Communities of Health ACHs were 1.37 to 1.75 times as likely to receive inpatient residential treatment and 1.47 to 1.63 times as likely to receive MOUD treatment relative to clients in King County.

FIGURE 11.
Regional Factors Associated with SUD Treatment Receipt, by Modality
UNTREATED CLIENTS

Lower Odds OF RECEIVING TREATMENT — AXIS = 1 Equal Odds — **Higher Odds** OF RECEIVING TREATMENT

OUTPATIENT TREATMENT (OP)
- Elevate Health 1.48
- Better Health Together 1.45
- SWACH 1.44
- Unattributed 1.30
- North Sound 1.29
- Olympic Communities of Health 0.96
- North Central 0.94

INPATIENT RESIDENTIAL TREATMENT (IP)
- North Sound 1.83
- SWACH 1.76
- North Central 1.75
- Unattributed 1.71
- Elevate Health 1.64
- Better Health Together 1.58
- Olympic Communities of Health 1.37

MEDICATION TREATMENT FOR OPIOID USE DISORDERS (MOUD)
- North Central 1.63
- Olympic Communities of Health 1.47
- Unattributed 1.41
- North Sound 1.23
- SWACH 1.11
- Better Health Together 1.10
- Elevate Health 0.93

NOTE: BOLD font indicates statistically significant odds ratios (OR)s. Model results for MOUD treatment are restricted to clients with an opioid use disorder diagnosis in 2017 or 2018.

Predictive Models: Clients with Recent SUD Treatment History

The following sections summarize the results of the logistic regression models estimated for clients who had previously received any SUD treatment in CY 2017 and 2018. In addition to the predictors reviewed above, we also included indicators of prior receipt of SUD treatment and other related services in these models. Compared to the range of factors associated with SUD treatment receipt among previously untreated clients, a smaller and more varied set of predictors were associated with receiving SUD treatment services among previously treated clients. Figures 12 through 17 highlight those factors significantly associated with two or more of the outcomes examined here and/or that suggest potential disparities in treatment access. A more exhaustive list of factors and their associated effect sizes is available in Appendix Table A2.

As noted in the Data and Methods section of this report, this subpopulation may include a combination of individuals participating in ongoing treatment and those who may have participated in an isolated SUD treatment event during the 2017 to 2018 period. Because we rely on administrative
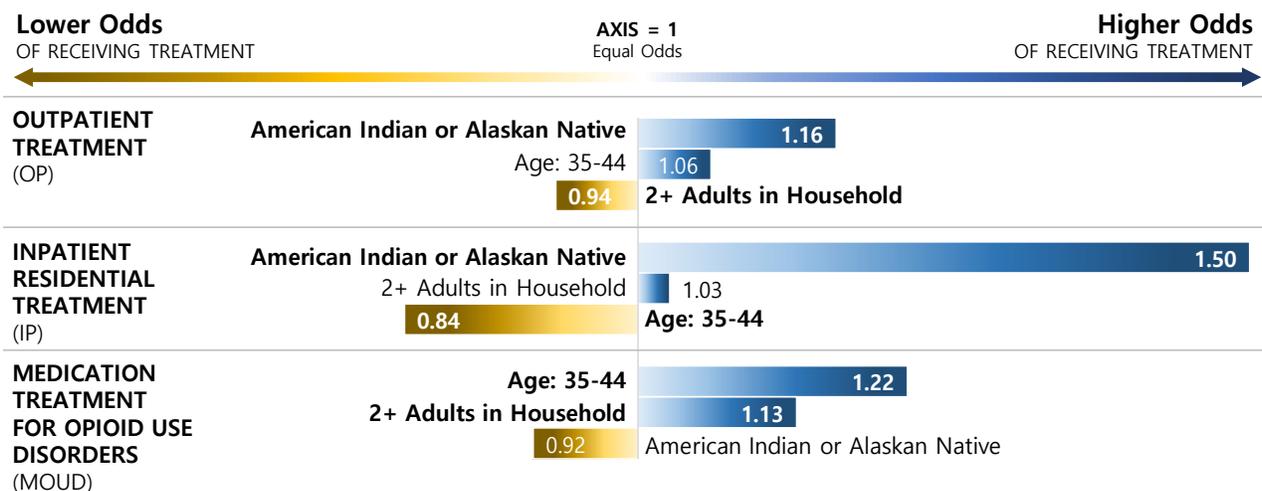
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data for these analyses, we do not have information on what motivated clients to seek SUD treatment in the CY 2017 to 2018 period.

Demographics and Household Characteristics. Controlling for other factors, previously treated Medicaid clients 35 and older were between 0.82 and 0.84 times as likely to receive inpatient treatment in CY 2019 than those 18 to 25 years of age (*see* Figure 12 and Table A2 in the Appendix). Clients ages 25 to 34 and 35 to 44 were 1.16 and 1.22 times as likely to receive MOUD treatment in 2019, respectively. Black/African American and Hispanic/Latino Medicaid clients with a diagnosed OUD were less likely (OR_{MOUD}=0.86) to receive MOUD treatment than white, non-Hispanic clients. American Indian and Alaskan Native clients were more likely than white, non-Hispanic clients to access outpatient (OR_{OP} = 1.16) and inpatient (OR_{IP} = 1.50) treatment in 2019.

Among previously treated clients, household composition had a limited impact on receipt of SUD treatment in CY 2019. Compared to single adults, clients sharing a household with one or more other adults were slightly less likely to receive SUD outpatient treatment (OR_{OP} = 0.94) and slightly more likely to receive MOUD treatment (OR_{MOUD} = 1.13).

FIGURE 12.
Demographic Factors Associated with SUD Treatment, by Modality
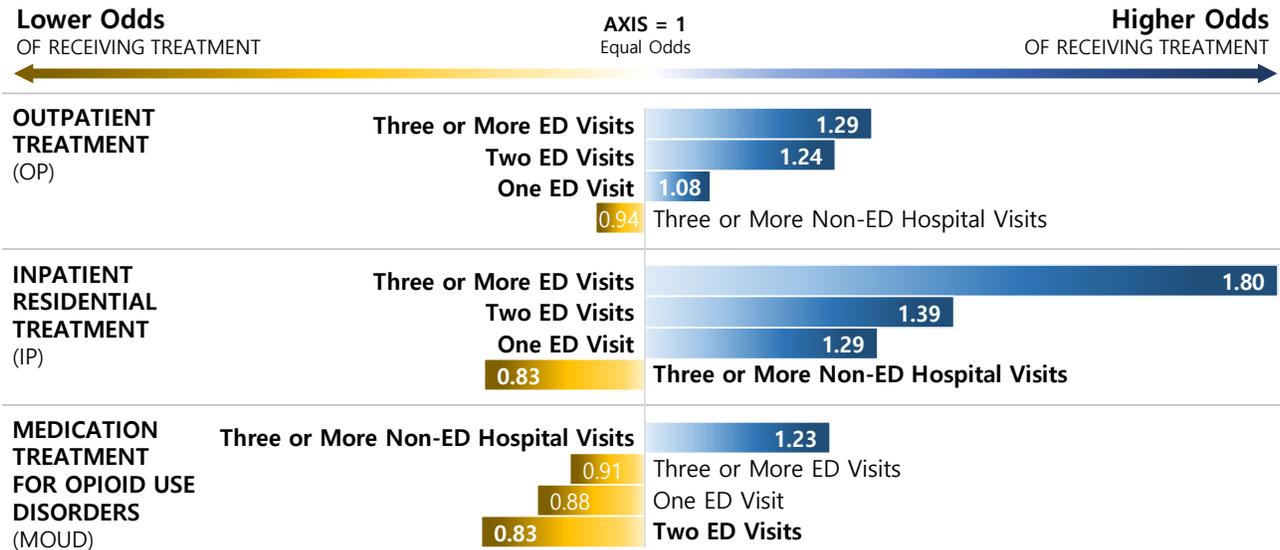PREVIOUSLY TREATED CLIENTS

Lower Odds
OF RECEIVING TREATMENT

AXIS = 1
Equal Odds

Higher Odds
OF RECEIVING TREATMENT

OUTPATIENT TREATMENT
(OP)

American Indian or Alaskan Native — **1.16**
Age: 35-44 — 1.06
0.94 — 2+ Adults in Household

INPATIENT RESIDENTIAL TREATMENT
(IP)

American Indian or Alaskan Native — **1.50**
2+ Adults in Household — 1.03
0.84 — Age: 35-44

MEDICATION TREATMENT FOR OPIOID USE DISORDERS
(MOUD)

Age: 35-44 — **1.22**
2+ Adults in Household — **1.13**
0.92 — American Indian or Alaskan Native

NOTE: **BOLD** font indicates statistically significant odds ratios (OR)s. Model results for MOUD treatment are restricted to clients with an opioid use disorder diagnosis in 2017 or 2018.

Medicaid Coverage, Pre-Existing Medical Conditions, and Prior Medical Care. Emergency department (ED) outpatient visits were associated with an increased likelihood of receiving outpatient and inpatient SUD treatment in 2019. As with previously untreated clients, this effect increased with the number of outpatient ED visits (*see* Figure 13). By contrast, ED visits were not consistently associated with receipt of MOUD treatment among individuals diagnosed with an OUD. However, three or more non-ED hospital visits in CY 2018 were associated with lower odds of receiving inpatient treatment and higher odds of receiving MOUD treatment in 2019 among previously treated clients.

FIGURE 13.

Healthcare Factors Associated with SUD Treatment Receipt, by Modality
PREVIOUSLY TREATED CLIENTS

Lower Odds
OF RECEIVING TREATMENT

AXIS = 1
Equal Odds

Higher Odds
OF RECEIVING TREATMENT

OUTPATIENT TREATMENT
(OP)

Three or More ED Visits	1.29
Two ED Visits	1.24
One ED Visit	1.08
0.94	Three or More Non-ED Hospital Visits

INPATIENT RESIDENTIAL TREATMENT
(IP)

Three or More ED Visits	1.80
Two ED Visits	1.39
One ED Visit	1.29
0.83	Three or More Non-ED Hospital Visits

MEDICATION TREATMENT FOR OPIOID USE DISORDERS
(MOUD)

Three or More Non-ED Hospital Visits	1.23
0.91	Three or More ED Visits
0.88	One ED Visit
0.83	Two ED Visits

NOTE: BOLD font indicates statistically significant odds ratios (OR)s. Model results for MOUD treatment are restricted to clients with an opioid use disorder diagnosis in 2017 or 2018.

SUD Diagnoses and Co-occurring Mental Health Disorders. Controlling for all other factors, sedative (OR_{IP} = 1.19), alcohol (OR_{IP} = 1.40), and stimulant use (OR_{IP} = 1.29) disorder diagnoses were associated with increased odds of receiving inpatient treatment services in CY 2019. Clients with an OUD and diagnosed sedative use disorder were 1.28 times as likely to receive MOUD treatment in CY 2019, while clients with an OUD and a co-occurring alcohol or stimulant use disorder were less likely to receive MOUD treatment (OR_{MOUD} = 0.66 and 0.81, respectively).

Previously treated clients diagnosed with other drug use disorders were more likely to receive outpatient, inpatient, and—among those with a co-occurring OUD—MOUD treatment services in 2019 (*see* Figure 14).

As with previously untreated clients, indicators of co-occurring MH disorders were associated with SUD treatment receipt in 2019. Regardless of whether they received MH treatment services in CY 2018, previously treated clients with some indication of a co-occurring, non-SMI MH disorder were 1.38 to 1.39 times as likely to receive inpatient residential SUD treatment in CY 2019 than those without a MH condition, but less likely to receive outpatient SUD services (OR_{OP} = 0.82 to 0.85).

Also in This Series

Washington State Behavioral Health Treatment and Recovery Support Services Utilization

JUNE 2021, Bittinger • Greener • Lucenko • Felver

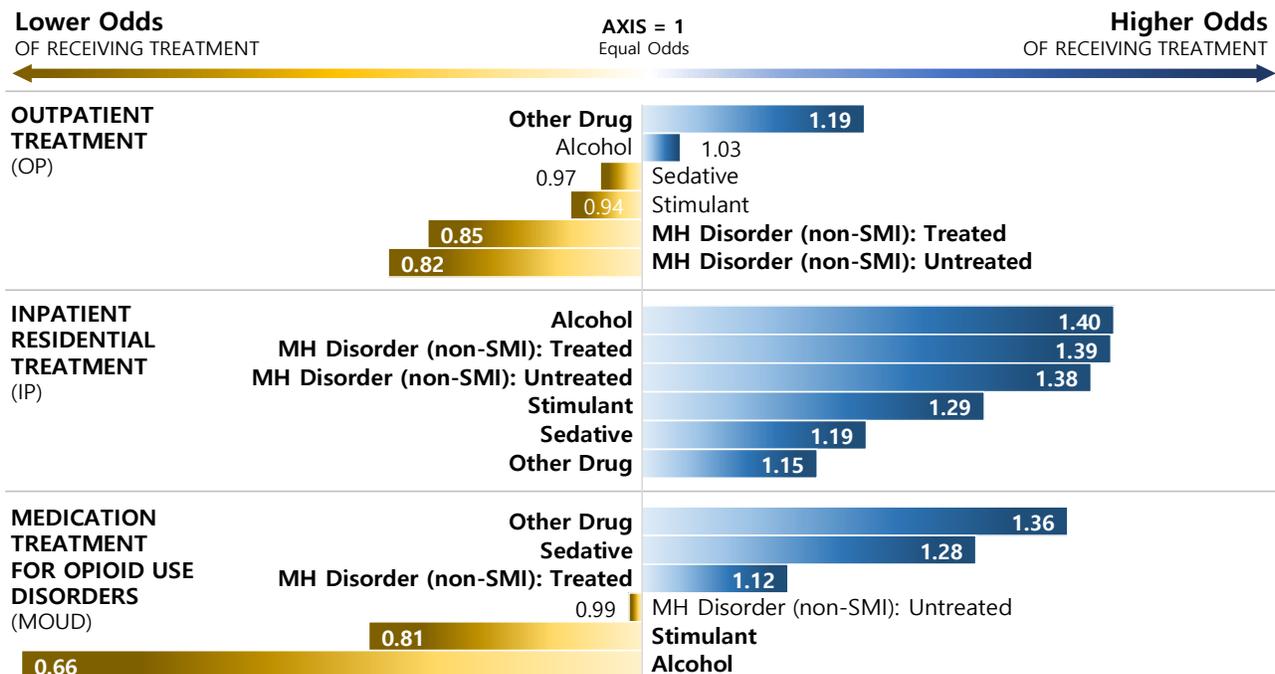**REPORT 1.** Prevalence of Substance Use Disorder Diagnoses among Medicaid Beneficiaries

REPORT 2. Variations in Behavioral Health Treatment Penetration Rates

REPORT 3. Variations in Utilization of Substance Use Disorder Treatment Modalities

REPORT 4. Physical Health and Social Outcomes among Medicaid Beneficiaries with and without Behavioral Health Diagnoses

Predicting Receipt of Substance Use Disorder Treatment Among Medicaid Clients
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FIGURE 14.

Behavioral Health Factors Associated with SUD Treatment Receipt, by Modality
PREVIOUSLY TREATED CLIENTS

Lower Odds
OF RECEIVING TREATMENT

AXIS = 1
Equal Odds

Higher Odds
OF RECEIVING TREATMENT

OUTPATIENT TREATMENT (OP)

Other Drug	1.19
Alcohol	1.03
0.97	Sedative
0.94	Stimulant
0.85	**MH Disorder (non-SMI): Treated**
0.82	**MH Disorder (non-SMI): Untreated**

INPATIENT RESIDENTIAL TREATMENT (IP)

Alcohol	1.40
MH Disorder (non-SMI): Treated	1.39
MH Disorder (non-SMI): Untreated	1.38
Stimulant	1.29
Sedative	1.19
Other Drug	1.15

MEDICATION TREATMENT FOR OPIOID USE DISORDERS (MOUD)

Other Drug	1.36
Sedative	1.28
MH Disorder (non-SMI): Treated	1.12
0.99	MH Disorder (non-SMI): Untreated
0.81	**Stimulant**
0.66	**Alcohol**

NOTE: BOLD font indicates statistically significant odds ratios (OR)s. Model results for MOUD treatment are restricted to clients with an opioid use disorder diagnosis in 2017 or 2018.
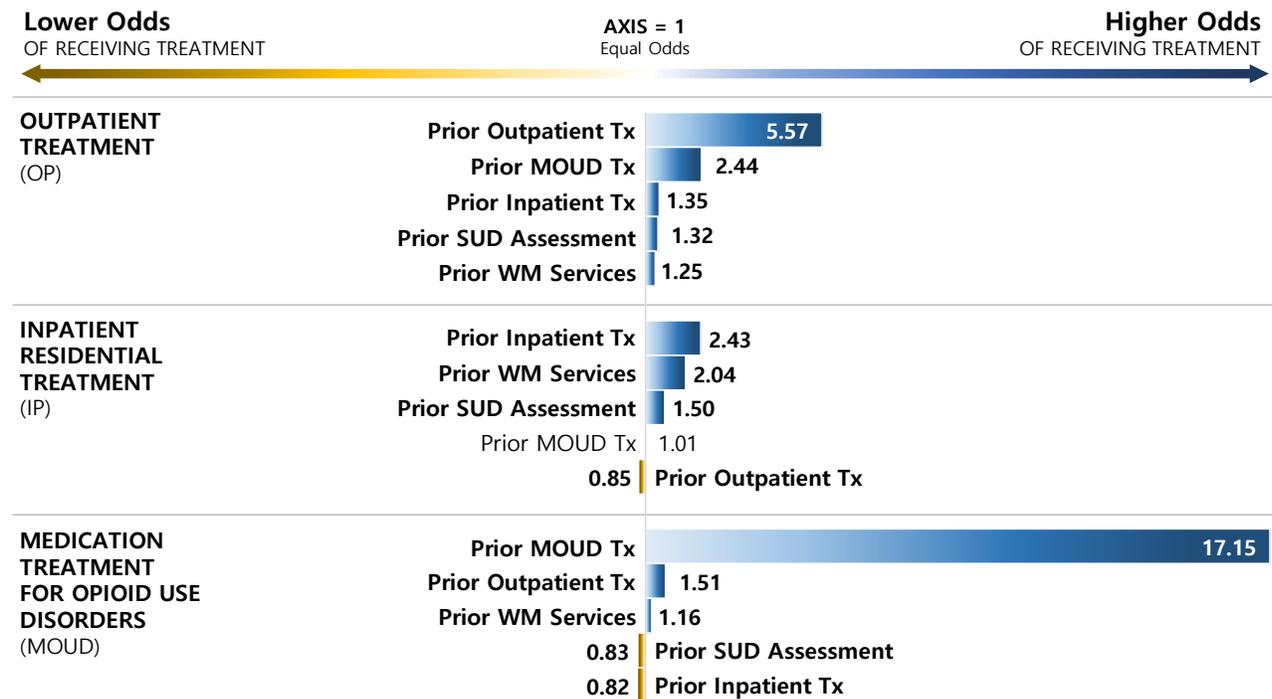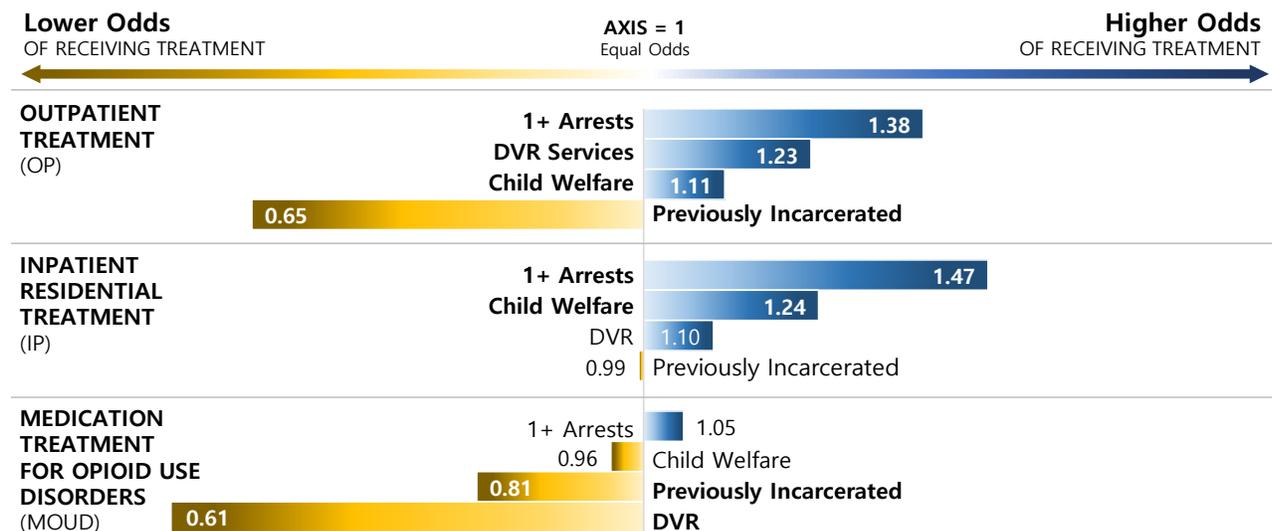
Prior Receipt of SUD Treatment Services. As shown in Figure 15, clients were more likely to receive the same treatment modality in CY 2019 that they received in the prior year. Clients with a diagnosed OUD who had previously received MOUD treatment services were 17.15 times as likely to receive this service in 2019 than clients who had not previously received MOUD. Similarly, clients who received outpatient treatment in CY 2018 were 5.57 times as likely to receive outpatient treatment services in 2019, and individuals previously treated in inpatient settings were 2.43 times as likely to receive inpatient treatment in 2019.

While many clients return to treatment modalities they received in the past, engaging in more than one SUD service type was also common. Individuals who received MOUD treatment in CY 2018 were 2.44 times as likely to receive outpatient treatment in CY 2019 relative to those who had not received MOUD. Another example of this was observed among clients with a diagnosed OUD, where individuals who previously received SUD outpatient treatment in 2018 were 1.51 times as likely to access MOUD treatment in 2019 than those who had not received outpatient services.

Similar patterns were also observed between the three treatment modalities of interest and SUD assessment and withdrawal management services. Clients who received medical withdrawal management (WM) services in CY 2018 were more likely to receive all three treatment modalities in 2019 compared to clients without WMS (OR$_{OP}$ = 1.25, OR$_{IP}$ = 2.04, OR$_{MOUD}$ = 1.16). Clients assessed for an SUD in 2018 were more likely to receive outpatient (OR$_{OP}$ = 1.32) and inpatient treatment (OR$_{IP}$ = 1.50) in 2019, but less likely to receive MOUD (OR$_{MOUD}$ = 0.83).

FIGURE 15.

SUD Treatment Factors Associated with SUD Treatment Receipt, by Modality
PREVIOUSLY TREATED CLIENTS

Lower Odds OF RECEIVING TREATMENT — AXIS = 1 Equal Odds — **Higher Odds** OF RECEIVING TREATMENT

OUTPATIENT TREATMENT (OP)

Factor	Odds Ratio
Prior Outpatient Tx	**5.57**
Prior MOUD Tx	**2.44**
Prior Inpatient Tx	**1.35**
Prior SUD Assessment	**1.32**
Prior WM Services	**1.25**

INPATIENT RESIDENTIAL TREATMENT (IP)

Factor	Odds Ratio
Prior Inpatient Tx	**2.43**
Prior WM Services	**2.04**
Prior SUD Assessment	**1.50**
Prior MOUD Tx	1.01
Prior Outpatient Tx	**0.85**

MEDICATION TREATMENT FOR OPIOID USE DISORDERS (MOUD)

Factor	Odds Ratio
Prior MOUD Tx	**17.15**
Prior Outpatient Tx	**1.51**
Prior WM Services	1.16
Prior SUD Assessment	**0.83**
Prior Inpatient Tx	**0.82**

NOTE: BOLD font indicates statistically significant odds ratios (OR)s. Model results for MOUD treatment are restricted to clients with an opioid use disorder diagnosis in 2017 or 2018.

Contact with Public Systems. Previously treated clients arrested in CY 2018 were 1.38 times as likely to receive outpatient SUD treatment and 1.47 times as likely to receive inpatient SUD treatment when compared to individuals who had not been arrested (*see* Figure 16). Conversely, clients who were incarcerated in CY 2017 were *less* likely to access outpatient and MOUD treatment services in CY 2019.

FIGURE 16.

Contact with Public Systems Associated with SUD Treatment Receipt, by Modality
PREVIOUSLY TREATED CLIENTS

Lower Odds OF RECEIVING TREATMENT — AXIS = 1 Equal Odds — **Higher Odds** OF RECEIVING TREATMENT

OUTPATIENT TREATMENT (OP)

Factor	Odds Ratio
1+ Arrests	**1.38**
DVR Services	**1.23**
Child Welfare	**1.11**
Previously Incarcerated	**0.65**

INPATIENT RESIDENTIAL TREATMENT (IP)

Factor	Odds Ratio
1+ Arrests	**1.47**
Child Welfare	**1.24**
DVR	**1.10**
Previously Incarcerated	0.99

MEDICATION TREATMENT FOR OPIOID USE DISORDERS (MOUD)

Factor	Odds Ratio
1+ Arrests	1.05
Child Welfare	0.96
Previously Incarcerated	**0.81**
DVR	**0.61**

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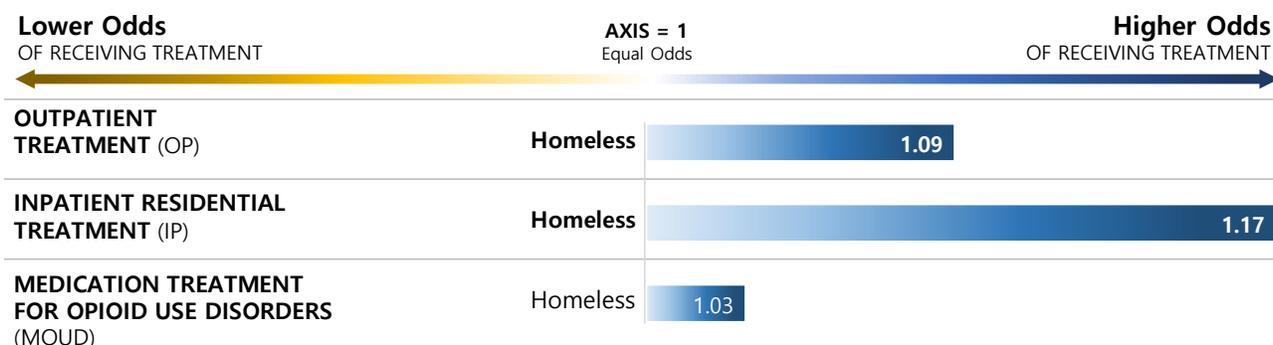SUPPORT ACT §1003 Roadmap to Recovery Planning Grant

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As was the case with clients who had not received SUD treatment services in 2017 or 2018, contact with the child welfare system was associated with an increased likelihood of receiving outpatient and inpatient treatment (OR_{OP} = 1.11, OR_{IP} = 1.24) in 2019. Receipt of Department of Vocational Rehabilitation (DVR) services in CY 2018 was associated with increased odds of receiving outpatient treatment (OR_{OP} = 1.23) and reduced odds of receiving MOUD treatment (OR_{MOUD} = 0.61) in CY 2019 among clients with a diagnosed OUD. Receipt of other state services were not consistent predictors of receipt of SUD treatment in CY 2019 among previously treated clients.

Socioeconomic Factors. Homelessness in CY 2018 was associated with an increased odds of receiving outpatient (OR_{OP} = 1.09) and inpatient treatment (OR_{IP} = 1.17) in 2019. In contrast to the results reported for clients previously untreated for SUD, percentage of quarters employed was only associated with increased likelihood of SUD inpatient treatment (OR_{IP} = 1.18; *see* Table A2 in the Appendix).

FIGURE 17.

Socioeconomic Factors Associated with SUD Treatment Receipt, by Modality
PREVIOUSLY TREATED CLIENTS

Lower Odds OF RECEIVING TREATMENT	AXIS = 1 Equal Odds		**Higher Odds** OF RECEIVING TREATMENT
OUTPATIENT TREATMENT (OP)	**Homeless**		**1.09**
INPATIENT RESIDENTIAL TREATMENT (IP)	**Homeless**		**1.17**
MEDICATION TREATMENT FOR OPIOID USE DISORDERS (MOUD)	Homeless	1.03	

NOTE: BOLD font indicates statistically significant odds ratios (OR)s. Model results for MOUD treatment are restricted to clients with an opioid use disorder diagnosis in 2017 or 2018.

Regional Factors. With some notable exceptions, previously treated clients associated with most ACHs were significantly less likely to receive outpatient and MOUD treatment services in CY 2019 compared to King County's (HealthierHere) ACH (*see* Figure 18). However, except for clients in the Cascade Pacific Action Alliance ACH, clients in other ACHs were 1.34 to 1.94 times as likely to receive inpatient treatment services in 2019 compared to clients in HealthierHere.
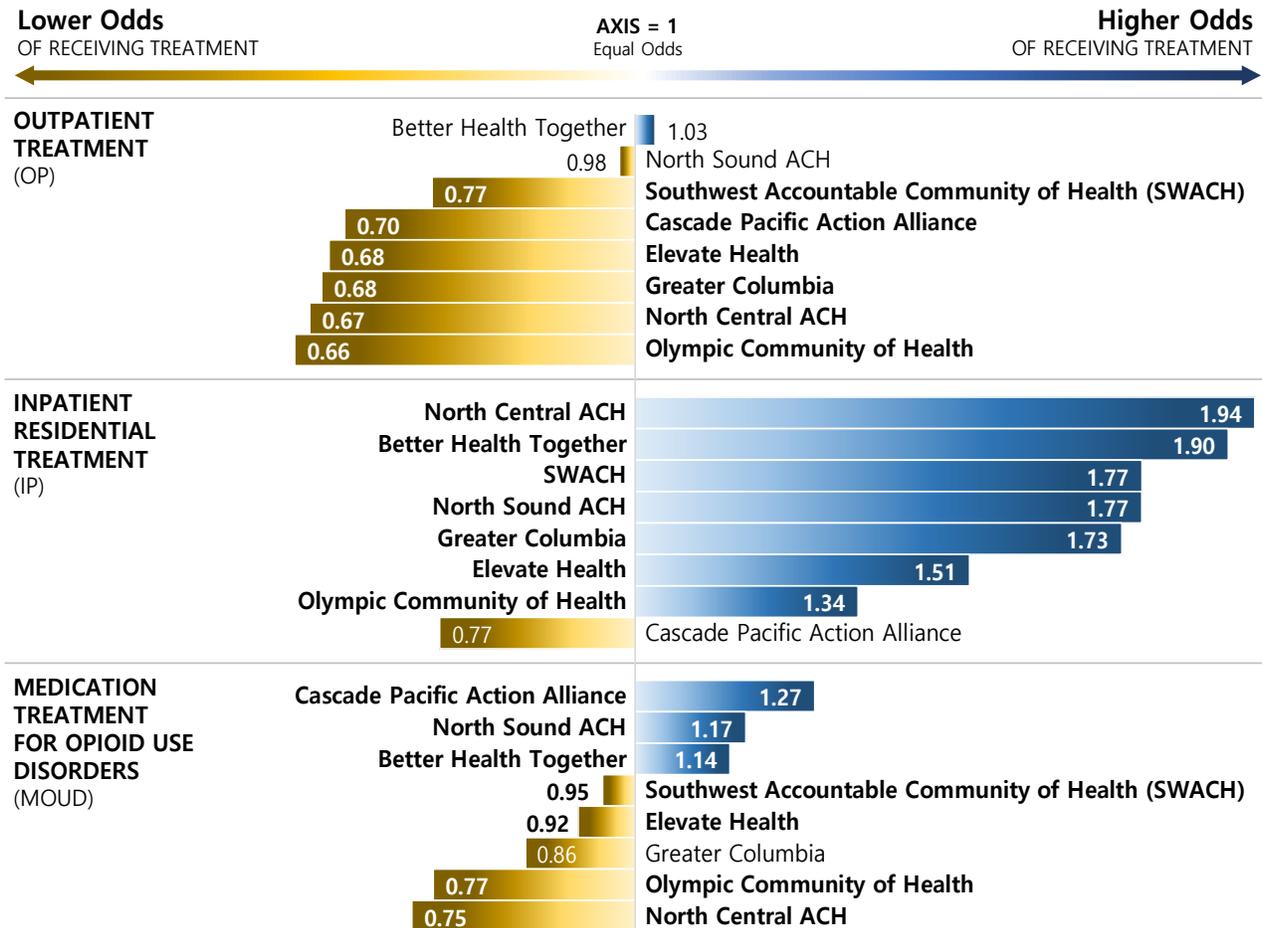
Most of the remaining contextual factors included in our models were unrelated to SUD treatment receipt in CY 2019 among previously treated clients. However, clients with a diagnosed OUD who resided in counties with localized primary care provider shortages[11] were 1.56 times as likely to access MOUD treatment in 2019 relative to clients living in counties with county-wide primary care shortages (*see* Table A2 in the Appendix).

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[11] Primary care shortages occur when healthcare services are difficult to access, existing services are over-utilized, and/or medical professional-to-population ratios exceed the recommended amount (Bureau of Health Professions, Health Resources and Services Administration 2019). A shortage is considered "localized" if it affects only part of a county and "pronounced" if it affects the entirety of the county. All 39 counties in Washington State experienced localized or pronounced mental health and primary care provider shortages in 2019 based on data reported in the 2018-2019 Area Health Resources File (Bureau of Health Professions, Health Resources and Services Administration 2019).

FIGURE 18.

Regional Factors Associated with SUD Treatment Receipt, by Modality
UNTREATED CLIENT

Lower Odds OF RECEIVING TREATMENT — AXIS = 1 Equal Odds — **Higher Odds** OF RECEIVING TREATMENT

OUTPATIENT TREATMENT (OP)

Region	OR
Better Health Together	1.03
North Sound ACH	0.98
Southwest Accountable Community of Health (SWACH)	0.77
Cascade Pacific Action Alliance	0.70
Elevate Health	0.68
Greater Columbia	0.68
North Central ACH	0.67
Olympic Community of Health	0.66

INPATIENT RESIDENTIAL TREATMENT (IP)

Region	OR
North Central ACH	1.94
Better Health Together	1.90
SWACH	1.77
North Sound ACH	1.77
Greater Columbia	1.73
Elevate Health	1.51
Olympic Community of Health	1.34
Cascade Pacific Action Alliance	0.77

MEDICATION TREATMENT FOR OPIOID USE DISORDERS (MOUD)

Region	OR
Cascade Pacific Action Alliance	1.27
North Sound ACH	1.17
Better Health Together	1.14
Southwest Accountable Community of Health (SWACH)	0.95
Elevate Health	0.92
Greater Columbia	0.86
Olympic Community of Health	0.77
North Central ACH	0.75

NOTE: **BOLD** font indicates statistically significant odds ratios (OR)s. Model results for MOUD treatment are restricted to clients with an opioid use disorder diagnosis in 2017 or 2018.

Discussion

The Washington State Health Care Authority was awarded a Phase 1 Planning Grant by the Centers for Medicare and Medicaid Services (CMS) under the SUPPORT ACT to develop an implementation strategy for improving treatment and recovery services. To inform this effort, this report summarizes the results of a series of foundational multivariate models that predict SUD treatment receipt among Medicaid clients. The goal of this analysis was to identify factors that are generally associated with receipt of three SUD treatment modalities in Washington State (outpatient, inpatient, and medication for opioid use disorders), disparities in treatment receipt, and areas for improvement. Overall, our analyses showed that:

1. A limited number of predictors included in our models were consistently associated with client uptake of SUD treatment;
2. Receipt of certain treatment modalities varies by geography;
3. Distinct factors are associated with current treatment receipt among individuals with and without a recent treatment history; and
4. It is difficult to determine who will start a new treatment episode among clients who had previously received treatment.

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Additional Detail on the Study's Findings, Implications, and Recommendations

The most powerful predictor of SUD treatment receipt in 2019 was prior receipt of SUD treatment. Our descriptive analyses demonstrated that clients who had previously received treatment in 2017 or 2018 were almost six times as likely to receive SUD treatment in 2019 compared to their previously untreated peers (62 percent treatment rate vs. 10 percent treatment rate, respectively). This difference in treatment rates is particularly concerning given that more than half (55 percent; n = 51,580) of the clients included in these analyses had not received any form of SUD treatment in 2017 or 2018. The issue is further compounded by our finding that, among previously untreated clients with already low treatment rates in 2019, adults ages 55 and older, women, and some communities of color were less likely to receive SUD treatment relative to white men ages 18 to 24.[12] Together, these findings indicate there may be opportunities to improve overall treatment rates by tailoring outreach to those less likely to seek or be referred to treatment using traditional mechanisms, particularly among demographic groups that appear to be disproportionally underserved.

Our analyses also indicate that clients often participate in the same type of treatment services that they received in the past. While this is not problematic in situations where a client is accessing treatment services effective in aiding in their recovery, it could reflect geographical differences in capacity by modality. Broadening the range of effective, evidence-based services available to Medicaid clients, regardless of region, will promote client choice and ensure that clients have access to a full range of appropriate care.

Social service receipt was largely unrelated to receipt of SUD treatment, which suggests that social service offices may not be sufficiently equipped to screen and refer clients to community treatment providers despite being a key point of contact between the state and its clients. As of the writing of this report, portions of the criminal legal system have implemented screening and outreach programs (e.g., the Recovery Navigator Program) in response to the *State v. Blake* ruling and the passage of SB5476. Similar efforts to implement universal screening services, such as evidence-based Screening and Brief Intervention, in DSHS Community Service Offices could connect vulnerable clients to needed services. Additionally, dismantling policies that may dissuade individuals with an SUD from seeking public assistance could increase opportunities to connect individuals to treatment providers.

Finally, given our finding that contact with emergency departments, child protective services, and the criminal legal system increased the odds that untreated clients would receive treatment in 2019, future research efforts could also focus on better understanding: (1) how those systems connect clients to SUD treatment services; and (2) the quality and duration of treatment services encountered by individuals involved with those systems.

Limitations and Future Directions

While these analyses highlight the need for additional interventions focused on connecting clients to treatment services, they are subject to several key limitations.

1. Omitted variable bias poses a threat to the validity of drawing inferences from statistical models. We mitigate this risk by including a variety of individual-level and contextual-level predictors that may be related to SUD treatment receipt. However, unobserved variables not captured here—such as client motivation to participate in treatment services—may also be associated with the outcomes in our study.

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[12] Lower treatment rates among previously untreated black or African American subpopulation can be attributed to enduring structural inequalities, such as unequal access to treatment services and culturally appropriate care in communities of color and inflated estimates of need due to over-policing and higher arrest rates for possession of controlled substances among clients of color (Office of Behavioral Health Equity, Substance Abuse and Mental Health Services Administration 2020).

2. Our analyses are not sufficiently granular enough to distinguish between factors that have immediate or longer-term impacts on SUD treatment receipt, or to identify factors that may be indirectly related to receipt of SUD treatment services. While these analyses identify factors associated with treatment receipt in the 2019, we did not examine how they affect treatment intensity and/or long-term retention in treatment.

3. Related to the preceding point, because of the coarse nature of our measures of SUD treatment receipt, we are unable to distinguish between shorter, discrete treatment episodes and long-term treatment engagement. Consequently, the "previously treated" population may contain a mix of clients treated at some point prior to December 2018 and clients engaged in a single treatment episode that spanned 2018 and 2019. The presence of clients currently engaged in treatment could have artificially inflated both the observed treatment rate among previously treated clients in the outcome period and the estimated relationship between prior treatment in 2018 and subsequent treatment in 2019.

4. The model results are based on data that include multiple subpopulations (e.g., clients with stimulant use disorders vs. OUD) that may exhibit distinct treatment-seeking behaviors or differ in the recommended course of treatment for their SUD. Including these groups in a single analytic dataset may obscure meaningful between-group differences in the relationships between the factors included in our models and SUD treatment receipt in 2019.

5. Because we rely on Medicaid claims to determine if a client received SUD treatment, we cannot observe treatment that was not publicly funded, nor are we able to determine if a client participated in non-Medicaid recovery options (e.g., externally funded, community recovery programs such as Alcoholics Anonymous). Before formulating interventions that focus on engaging previously untreated clients, it would be prudent to determine how many of these individuals are accessing other resources available in their community as part of their recovery.

6. While the period selected for our analyses occurs before the onset of the COVID-19 pandemic, it still overlaps with the implementation of several statewide interventions that focused on improving access to SUD treatment services (e.g., the 1115 Medicaid Transformation Project, State Opioid Response [SOR], etc.) that may have impacted our findings.

Future studies involving more nuanced analyses can address many of these limitations. These studies should be conducted to determine which of the factors examined here are associated with access to SUD treatment modalities for different populations in Washington State.

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TABLE A1.

Parameter Estimates for Individuals Who Did Not Receive Any SUD Treatment in 2017 or 2018

UNTREATED CLIENTS

	SUD Outpatient Services N = 51,580 Events = 3,583 6.9%		SUD Inpatient Services N = 51,580 Events = 1,244 2.4%		SUD Medication Treatment N = 10,771 Events = 1,175 10.9%	
Statistically significant at p ≤ 0.05 / Statistically significant at p ≤ 0.01	Odds Ratio	P-Value	Odds Ratio	P-Value	Odds Ratio	P-Value
Client Demographics						
Age: 25-34 (relative to 18 - 24 year olds)	1.1568	0.0287	1.3435	0.0146	1.0128	0.9141
Age: 35-44 (relative to 18 - 24 year olds)	1.0503	0.4783	1.2061	0.0188	0.8876	0.3913
Age: 45-54 (relative to 18 - 24 year olds)	0.7980	0.0138	0.9768	0.8290	0.6850	0.0169
Age: 55-64 (relative to 18 - 24 year olds)	0.6413	<.0001	0.8164	0.1181	0.6077	0.0016
Female, Not Pregnant (relative to male)	0.8621	<.0001	0.7790	<.0001	1.1013	0.0740
Female, Pregnant (relative to male)	1.1650	0.0112	0.8770	0.2743	0.6811	0.0033
American Indian or Alaskan Native (relative to white)	1.1321	0.0134	1.1870	0.0057	1.2229	0.0006
Asian (relative to white)	0.9412	0.5104	0.7465	0.0388	0.6523	0.0017
Black or African American (relative to white)	0.8932	0.4434	0.7205	0.0526	0.7411	<.0001
Hispanic or Latino (relative to white)	1.0094	0.8798	0.8082	0.0383	0.9198	0.4241
Native Hawaiian or Pacific Islander (relative to white)	0.9266	0.3627	1.0502	0.7673	0.9684	0.9119
Missing Education Data (relative to high school education)	0.9787	0.9140	1.0789	0.8507	0.6790	0.2315
Less than High School (relative to high school education)	0.9937	0.8519	1.0411	0.4332	0.9152	0.2479
Some College (relative to high school education)	1.0188	0.7628	0.8685	0.0901	1.0364	0.5707
BA or Higher (relative to high school education)	0.9132	0.4309	0.9403	0.6964	1.4457	0.0911
Two or More Adults in the Household	0.8311	0.0001	0.7307	0.0205	0.7344	<.0001
Child 12 Years of Age or Younger in the Household	1.0254	0.6303	1.0703	0.5912	1.0302	0.7696
Veteran	0.7549	0.0083	0.8471	0.4425	0.4641	0.0363
Medicaid Coverage, Pre-Existing Medical Conditions, and Prior Medical Care						
Met State or Federal Disability Standards, CY 2018	1.1063	0.0518	1.0083	0.9165	1.1408	0.5332
Expansion Medicaid, CY 2018	0.8344	0.0202	0.8580	0.2457	0.9687	0.7422
Disabled Medicaid, CY 2018	0.8399	0.2431	0.8458	0.4964	0.6914	0.1816
Classic Medicaid, CY 2018	1.0293	0.7420	0.9963	0.9816	1.2640	0.0189
Hospitalized in a General Medical Setting, CY 2018	0.9151	0.0411	1.0244	0.7735	1.0658	0.5085
Outpatient ED Visits (CY 2018): 1 (relative to 0 visits)	1.2794	0.0011	1.7213	<.0001	1.5697	0.0006
Outpatient ED Visits (CY 2018): 2 (relative to 0 visits)	1.4275	<.0001	1.8586	<.0001	1.4601	0.0040
Outpatient ED Visits (CY 2018): 3+ (relative to 0 visits)	1.4776	0.0005	2.4109	<.0001	2.1181	<.0001
Non-ED Outpatient Hospital Visits (CY 2018): 1 (relative to 0 visits)	0.8799	0.0786	0.7963	0.0360	0.7681	0.0202
Non-ED Outpatient Hospital Visits (CY 2018): 2 (relative to 0 visits)	0.8533	0.1130	0.9222	0.6118	0.7246	0.0380
Non-ED Outpatient Hospital Visits (CY 2018): 3+ (relative to 0 visits)	0.6681	<.0001	0.6026	0.0009	0.5365	<.0001
Ambulatory or Preventative Care, CY 2018	1.0386	0.5464	0.8165	0.0012	1.0583	0.5526
Chronic Illness Risk Score: 1 to 1.49 (relative to < 1)	1.0135	0.7597	1.0733	0.4421	0.9845	0.7987
Chronic Illness Risk Score: 1.5 to 1.99 (relative to < 1)	0.9314	0.2771	1.0579	0.6447	0.8312	0.2208
Chronic Illness Risk Score: 2 to 4.99 (relative to < 1)	0.8932	0.0161	1.2541	0.0111	0.7424	0.0146
Chronic Illness Risk Score: 5+ (relative to < 1)	0.7367	0.0521	0.9849	0.9254	0.7203	0.1078
Overdose Event, CY 2018	0.9945	0.9598	0.9017	0.6499	1.6514	<.0001
Poisoning Event, CY 2018	1.0090	0.9259	0.8835	0.4027	0.7126	0.0836

	SUD Outpatient Services N = 51,580 Events = 3,583 **6.9%**		SUD Inpatient Services N = 51,580 Events = 1,244 **2.4%**		SUD Medication Treatment N = 10,771 Events = 1,175 **10.9%**	
	Odds Ratio	P-Value	Odds Ratio	P-Value	Odds Ratio	P-Value
SUD Diagnoses and Co-occurring Mental Health Disorders						
MH Tx Disorder (non-SMI): Untreated (relative to no mental health disorder)	1.3531	<.0001	1.6533	<.0001	1.1442	0.1407
MH Tx Need (non-SMI): Treated (relative to no mental health disorder)	1.1729	0.0012	1.6103	<.0001	0.7838	0.0234
SMI: Untreated (relative to no mental health disorder)	1.5931	<.0001	1.8606	<.0001	1.0235	0.8390
SMI: Treated (relative to no mental health disorder)	1.7157	<.0001	1.8029	<.0001	0.9527	0.6555
Alcohol Use Disorder Dx, CY 2017 or 2018	1.6984	<.0001	2.3152	<.0001	0.9537	0.6060
Cannabis Use Disorder Dx, CY 2017 or 2018	0.8374	0.0018	0.7296	<.0001	0.8244	0.0046
Other Drug Use Disorder Dx, CY 2017 or 2018	1.3569	<.0001	1.5005	<.0001	1.2749	0.0003
Opioid Use Disorder Dx, CY 2017 or 2018	1.5256	<.0001	1.4131	<.0001	—	—
Sedative Use Disorder Dx, CY 2017 or 2018	1.2080	0.1902	1.1076	0.4407	1.2711	0.3773
Stimulant Use Disorder Dx, CY 2017 or 2018	1.5866	<.0001	1.8158	<.0001	1.0715	0.5561
Contact with Public Systems						
Basic Food, CY 2018	1.0102	0.6760	0.9105	0.1856	1.0733	0.2747
TANF, CY 2018	0.9998	0.9981	0.7815	0.2253	1.1292	0.3734
ABD/HEN, CY 2018	0.9677	0.5472	0.7371	0.0005	0.8485	0.4379
SSI, CY 2018	0.8956	0.3057	0.9396	0.7282	1.0697	0.7469
Child Welfare Involvement, CY 2018	1.5513	<.0001	1.2652	0.0301	0.8820	0.3065
DVR Service, CY 2018	1.0440	0.6812	0.5476	0.0789	1.2013	0.5073
ALTSA Service, CY 2018	0.7852	0.0012	0.8219	0.1329	0.9617	0.8217
Received Commerce-Funded Homelessness Services, CY 2018	1.1051	0.1283	1.3059	0.0002	0.8775	0.1173
1+ Arrests, CY 2018	1.9814	<.0001	1.6920	<.0001	1.6037	<.0001
1+ Alcohol or Drug-Related Charges, CY 2018	1.9538	<.0001	1.0056	0.9715	1.2577	0.1099
1+ Drug Convictions, CY 2018	1.1156	0.2453	1.3017	0.0298	1.3307	0.0030
Previously Incarcerated, CY 2017	1.2563	0.1096	0.8342	0.5065	1.9257	0.0001
Socioeconomic Factors						
Employed, CY 2018	1.1329	0.0131	0.9813	0.8126	1.1308	0.1258
% of Quarters Employed Since 1997 or Turning 14	1.3497	0.0007	1.6018	0.0015	0.8749	0.3316
Homeless, CY 2018	1.4256	<.0001	1.3817	0.0001	1.6079	<.0001
Regional Factors						
Urban, Low, Medium Density vs. Rural Census Tract	1.1248	0.0910	1.1742	0.2759	0.8670	0.2723
ACH: Better Health Together (relative to HealthierHere)	1.4512	<.0001	1.5823	0.0006	1.1047	0.3220
ACH: Cascade Pacific Action Alliance (relative to HealthierHere)	0.9738	0.8169	0.7738	0.0550	1.5771	0.0004
ACH: Elevate Health (relative to HealthierHere)	1.4777	<.0001	1.6390	<.0001	0.9252	0.0413
ACH: Greater Columbia (relative to HealthierHere)	0.9961	0.9788	1.2848	0.2361	1.1565	0.4839
ACH: North Central (relative to HealthierHere)	0.9433	0.6694	1.7480	0.0015	1.6274	0.0222
ACH: North Sound (relative to HealthierHere)	1.2867	<.0001	1.8320	<.0001	1.2338	0.0822
ACH: Olympic Communities of Health (relative to HealthierHere)	0.9612	0.8012	1.3737	0.0284	1.4655	0.0031
ACH: SWACH (relative to HealthierHere)	1.4353	<.0001	1.7580	<.0001	1.1136	0.1154
ACH: Unattributed (relative to HealthierHere)	1.3029	0.0596	1.7110	0.0001	1.4121	0.0022
Mental Health Care Provider Shortage: Low vs. High	0.8516	0.0689	0.9585	0.7913	1.0133	0.9236
Primary Care Provider Shortage: Low vs. High	1.1829	0.4008	1.5366	0.0027	0.9816	0.8614
ADI: Block (National)	0.9991	0.5309	1.0003	0.9148	0.9970	0.1517

Legend:
- Statistically significant at p ≤ 0.05
- Statistically significant at p ≤ 0.01

**Suppressed due to small numbers (n<11).

DSHS

TABLE A2.

Parameter Estimates for Individuals Who Previously Received Any Treatment in 2017 or 2018

PREVIOUSLY TREATED CLIENTS

	SUD Outpatient Services N = 41,673 Events = 17,159 **41.2%**		SUD Inpatient Services N = 41,673 Events = 3,949 **9.5%**		SUD Medication Treatment N = 25,543 Events = 17,279 **67.6%**	
	Odds Ratio	P-Value	Odds Ratio	P-Value	Odds Ratio	P-Value
Client Demographics						
Age: 25-34 (relative to 18 - 24 year olds)	1.0945	0.1267	0.9732	0.6486	1.1585	0.0398
Age: 35-44 (relative to 18 - 24 year olds)	1.0594	0.3605	0.8405	0.0025	1.2190	0.0066
Age: 45-54 (relative to 18 - 24 year olds)	1.0388	0.5737	0.8214	0.0007	1.0926	0.3067
Age: 55-64 (relative to 18 - 24 year olds)	1.0650	0.4864	0.8278	0.0142	1.1584	0.2592
Female, Not Pregnant (relative to male)	1.0401	0.1418	0.8885	0.0063	0.9764	0.6163
Female, Pregnant (relative to male)	1.0643	0.2959	0.8595	0.0831	0.8706	0.0717
American Indian or Alaskan Native (relative to white)	1.1611	0.0336	1.4972	<.0001	0.9215	0.1007
Asian (relative to white)	1.0685	0.3256	1.1436	0.2099	0.8808	0.3180
Black or African American (relative to white)	0.9486	0.0758	1.0037	0.9573	0.8580	0.0274
Hispanic or Latino (relative to white)	1.0180	0.6747	1.0236	0.7214	0.8594	0.0398
Native Hawaiian or Pacific Islander (relative to white)	0.9540	0.6409	0.9084	0.5969	0.9206	0.5595
Missing Education Data (relative to high school education)	0.8606	0.2700	0.9032	0.5594	0.8648	0.5498
Less than High School (relative to high school education)	0.9775	0.3720	0.9593	0.3744	0.9624	0.3896
Some College (relative to high school education)	0.9768	0.3437	1.0049	0.9255	0.9584	0.3761
BA or Higher (relative to high school education)	0.8661	0.0392	1.3250	0.0863	0.9580	0.6711
Two or More Adults in the Household	0.9373	0.0368	1.0258	0.6663	1.1290	0.0180
Child 12 Years of Age or Younger in the Household	0.9938	0.8791	0.8978	0.1359	1.1142	0.0433
Veteran	1.0554	0.5093	1.0492	0.7457	0.8171	0.0405
Medicaid Coverage, Pre-Existing Medical Conditions, and Prior Medical Care						
Met State or Federal Disability Standards, CY 2018	1.1093	0.0069	1.0695	0.3688	1.0994	0.0570
Expansion Medicaid, CY 2018	1.0298	0.5768	1.0311	0.6522	0.9697	0.7127
Disabled Medicaid, CY 2018	1.0067	0.9570	0.9912	0.9606	1.0950	0.4678
Classic Medicaid, CY 2018	1.0797	0.0891	0.9995	0.9918	1.1177	0.2290
Hospitalized in a General Medical Setting, CY 2018	1.0469	0.2445	1.1316	0.0167	0.9303	0.2657
Outpatient ED Visits (CY 2018): 1 (relative to 0 visits)	1.0827	0.0344	1.2933	0.0002	0.8807	0.0553
Outpatient ED Visits (CY 2018): 2 (relative to 0 visits)	1.2400	<.0001	1.3893	<.0001	0.8294	0.0245
Outpatient ED Visits (CY 2018): 3+ (relative to 0 visits)	1.2861	<.0001	1.7970	<.0001	0.9139	0.1859
Non-ED Outpatient Hospital Visits (CY 2018): 1 (relative to 0 visits)	1.0213	0.7027	0.9275	0.3183	1.1481	0.0771
Non-ED Outpatient Hospital Visits (CY 2018): 2 (relative to 0 visits)	0.9552	0.3094	0.9001	0.1533	1.1848	0.0245
Non-ED Outpatient Hospital Visits (CY 2018): 3+ (relative to 0 visits)	0.9420	0.3445	0.8319	0.0117	1.2334	0.0019
Ambulatory or Preventative Care, CY 2018	0.8761	0.0094	0.9988	0.9828	0.8638	0.1538
Chronic Illness Risk Score: 1 to 1.49 (relative to < 1)	0.9647	0.3098	1.1144	0.0018	1.0571	0.0995
Chronic Illness Risk Score: 1.5 to 1.99 (relative to < 1)	0.9455	0.1868	0.9828	0.8396	0.9945	0.9131
Chronic Illness Risk Score: 2 to 4.99 (relative to < 1)	0.9464	0.2284	1.1124	0.0825	0.8928	0.0667
Chronic Illness Risk Score: 5+ (relative to < 1)	0.8252	0.2227	1.0476	0.6623	0.9682	0.8543
Overdose Event, CY 2018	1.0281	0.7981	1.0551	0.6365	1.1550	0.0210
Poisoning Event, CY 2018	0.9092	0.3000	1.0499	0.7336	0.8216	0.1547
SUD Diagnoses and Co-occurring Mental Health Disorders						
MH Tx Disorder (non-SMI): Untreated (relative to no mental health disorder)	0.8244	0.0266	1.3767	0.0001	0.9891	0.8021
MH Tx Need (non-SMI): Treated (relative to no mental health disorder)	0.8476	0.0490	1.3933	0.0007	1.1224	0.0452

Statistically significant at p ≤ 0.05
Statistically significant at p ≤ 0.01

	SUD Outpatient Services N = 41,673 Events = 17,159 **41.2%**		SUD Inpatient Services N = 41,673 Events = 3,949 **9.5%**		SUD Medication Treatment N = 25,543 Events = 17,279 **67.6%**	
	Odds Ratio	P-Value	Odds Ratio	P-Value	Odds Ratio	P-Value
SMI: Untreated (relative to no mental health disorder)	1.0295	0.7316	1.3911	0.0005	1.1233	0.1113
SMI: Treated (relative to no mental health disorder)	1.0378	0.6616	1.4502	<.0001	1.0630	0.2766
Alcohol Use Disorder Dx, CY 2017 or 2018	1.0322	0.5674	1.3958	<.0001	0.6576	<.0001
Cannabis Use Disorder Dx, CY 2017 or 2018	0.8821	0.0099	1.0056	0.9173	0.9508	0.1900
Other Drug Use Disorder Dx, CY 2017 or 2018	1.1866	<.0001	1.1469	0.0091	1.3570	<.0001
Opioid Use Disorder Dx, CY 2017 or 2018	1.2844	<.0001	0.9758	0.5887	—	—
Sedative Use Disorder Dx, CY 2017 or 2018	0.9660	0.6124	1.1882	<.0001	1.2801	0.0003
Stimulant Use Disorder Dx, CY 2017 or 2018	0.9433	0.1123	1.2871	<.0001	0.8134	<.0001
Prior Receipt of SUD Treatment Services						
Received SUD Outpatient Services, CY 2018	5.5672	<.0001	0.8460	0.0005	1.5148	<.0001
Received SUD Inpatient Services, CY 2018	1.3540	<.0001	2.4273	<.0001	0.8228	<.0001
Received MOUD Treatment, CY 2018	2.4446	<.0001	1.0117	0.8479	17.1535	<.0001
Received SUD Assessment Services, CY 2018	1.3196	0.0006	1.4956	<.0001	0.8314	0.0095
Received Medical Withdrawal Management Services, CY 2018	1.2488	0.0057	2.0354	<.0001	1.1563	0.0035
Contact with Public Systems						
Basic Food, CY 2018	1.0307	0.6193	0.9849	0.8102	0.9597	0.4018
TANF, CY 2018	0.9344	0.3232	0.7817	0.0576	0.8242	0.0167
ABD/HEN, CY 2018	0.9280	0.0606	0.9163	0.3717	0.9115	0.3322
SSI, CY 2018	1.0247	0.7479	0.9237	0.6871	0.9738	0.8463
Child Welfare Involvement, CY 2018	1.1107	0.0402	1.2387	<.0001	0.9552	0.2259
DVR Service, CY 2018	1.2284	0.0054	1.0954	0.4371	0.6091	<.0001
ALTSA Service, CY 2018	0.8556	0.0356	0.7482	0.0576	0.8339	0.0833
Received Commerce-Funded Housing/Homelessness Services, CY 2018	1.0500	0.0526	1.0193	0.6533	1.0784	0.0625
1+ Arrests, CY 2018	1.3815	<.0001	1.4699	<.0001	1.0545	0.4613
1+ Alcohol or Drug-Related Charges, CY 2018	1.6486	<.0001	1.0538	0.3238	0.9798	0.8227
1+ Drug Convictions, CY 2018	0.8685	0.0259	0.9321	0.4643	1.0834	0.1991
Previously Incarcerated, CY 2017	0.6516	<.0001	0.9936	0.9622	0.8142	0.0073
Socioeconomic Factors						
Employed, CY 2018	1.0207	0.4047	1.0922	0.1158	1.0534	0.2352
% of Quarters Employed Since 1997 or Turning 14	0.9817	0.8242	1.1805	0.0470	1.0395	0.4658
Homeless, CY 2018	1.0859	0.0160	1.1746	0.0016	1.0282	0.3177
Regional Factors						
Urban, Low, Medium Density vs. Rural Census Tract	1.0348	0.5304	1.0202	0.7337	1.1299	0.1248
ACH: Better Health Together (relative to HealthierHere)	1.0300	0.6920	1.8957	<.0001	1.1432	0.0007
ACH: Cascade Pacific Action Alliance (relative to HealthierHere)	0.6951	0.0002	0.7721	0.0768	1.2712	<.0001
ACH: Elevate Health (relative to HealthierHere)	0.6839	<.0001	1.5050	<.0001	0.9208	0.0004
ACH: Greater Columbia (relative to HealthierHere)	0.6788	<.0001	1.7350	<.0001	0.8581	0.0991
ACH: North Central (relative to HealthierHere)	0.6705	0.0005	1.9358	<.0001	0.7478	0.0603
ACH: North Sound (relative to HealthierHere)	0.9770	0.6805	1.7651	<.0001	1.1672	0.0014
ACH: Olympic Communities of Health (relative to HealthierHere)	0.6605	<.0001	1.3367	0.0047	0.7664	0.0448
ACH: SWACH (relative to HealthierHere)	0.7654	<.0001	1.7654	<.0001	0.9531	0.0514
ACH: Unattributed (relative to HealthierHere)	0.9328	0.3316	1.5129	0.0001	0.9653	0.7100
Mental Health Care Provider Shortage: Low vs. High	0.9742	0.7803	1.0126	0.9133	0.9431	0.4783
Primary Care Provider Shortage: Low vs. High	1.1216	0.3140	1.1615	0.1940	1.5628	0.0016
ADI: Block (National)	1.0000	0.9772	0.9979	0.0575	1.0008	0.4083

Statistically significant at p ≤ 0.05
Statistically significant at p ≤ 0.01

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OVERVIEW AND STUDY POPULATION

The population of interest for these analyses includes Medicaid recipients who met the following criteria: 1) are between the ages of 18 and 64 as of December 31, 2018; 2) received any publicly funded medical assistance in December, 2018; 3) had some form of qualifying Title XIX Medicaid coverage for 11 out of 12 months in calendar year (CY) 2018; 4) had some form of qualifying Title XIX Medicaid coverage for 11 out of 12 months in calendar year (CY) 2019; 5) did not have any form of Medicare or third-party liability coverage in 2018; and 6) had some indication of a substance use disorder (SUD) condition in CY 2017 or 2018 based on medical claims, prescription, and arrest data. The study period was restricted to calendar years 2017 and 2018 and the outcome period to 2019 to ensure that the results were not biased by the onset of the COVID-19 pandemic and subsequent statewide shutdowns. The starting population for these analyses included 99,931 unique Medicaid clients; 6,678 of these individuals were removed from the analyses because they lacked sufficient geographic information. The final population for this study included 93,253 individuals: 41,673 who had received some form of SUD treatment in CY 2017 or 2018, and 51,580 who had not received treatment during this period.

Given that medication for opioid use disorders (MOUD) treatments target individuals with a diagnosed opioid use disorder, we limited all analyses of MOUD treatment to those individuals who met the above criteria and had an opioid use disorder diagnosis in CY 2017 or 2018. This further reduced the sample size to 36,314 Medicaid clients. Of these clients 25,543 had previously received SUD treatment, while 10,771 had not.

Outcome Measures

We examined three treatment modalities in this report: outpatient, inpatient/residential, and medication for opioid use disorders (MOUD). Outcome measures were constructed using client-level information obtained from state administrative data systems, including the Integrated Client Databases (ICDB) and ProviderOne medical claims data. Descriptions of each outcome measure are provided below; detailed information about treatment modalities are available in the Service Encounter Reporting Instructions. Additional treatment modalities, evidence-based approaches, and screenings, such as Screening, Brief Intervention, and Referral to Treatment (SBIRT), were not included due to limited prevalence in the population and/or known underreporting issues.

- *Outpatient Treatment:* Receipt of an outpatient SUD treatment service, including case management. Excludes opiate substitution treatment (OST), also known as methadone treatment.
- *Inpatient/Residential Treatment:* Receipt of inpatient or residential treatment for an SUD (excludes detoxification services).
- *Medication for Opioid Use Disorders:* Receipt of buprenorphine, buprenorphine-naloxone, naltrexone, or opiate substitution treatment (methadone) for treatment of SUD.

Analytic Approach

We employed binary logit models to estimate the impact of various pre-period predictors constructed using pre-period data from CY 2017 and/or CY 2018 on SUD treatment engagement in CY 2019. All pre-period predictors were constructed using information from the ICDB and ProviderOne. A wide range of predictors were identified for potential inclusion in these models; an indicator was selected for inclusion in the final model specifications presented here if: 1) bivariate analyses indicated that it was associated with the outcomes of interest; 2) this association persisted even after related variables were introduced into the model (i.e., it was not collinear with other predictors); and 3) it contributed to the overall fit of the model. Different time specifications (e.g., TANF receipt in the prior 3, 6, or 12 months) were tested for each independent variable. The select time specification was selected using several criteria, including the overall strength of the relationship between the predictor and the outcome of interest, the consistency of these relationships across outcomes, and interpretability. For ease of presentation, all predictors were organized into "blocks" of conceptually related measures.

With one notable exception (percentage of quarters employed), almost all of the independent variables included in our models are treated as categorical variables. Consequently, the reported effect sizes are the ratio of the odds of receiving SUD treatment for a subpopulation of interest *relative to* the odds of receiving treatment for members of some reference group (i.e., the *odds ratio* [OR]). Because the OR compares how likely an outcome is among these two groups, the estimated effect size is sensitive to which group is treated as the reference category.

DSHS Research and Data Analysis Division
Olympia, Washington

In our models the majority of estimated effects compare treatment outcomes for clients who experienced some type of event (e.g., being arrested in CY 2018) relative to those who did not. For the remaining variables in our models, we coded the effects in a way that highlighted potentially meaningful differences/disparities between groups. For example, we compared clients of color to white, non-Hispanic clients to determine if known disparities in SUD treatment access persisted following the inclusion of other statistical control in our models and, consequently, if future corrective actions by the state—in consultation with representatives of the community in question—were required. Similarly, for other categorical measures (e.g., co-occurring mental health disorders with/without treatment, chronic disease burden, etc.), we compared clients with more complex care needs to individuals with (potentially) fewer health-related barriers to treatment to better understand if additional efforts are needed to connect clients with significant care needs to treatment.

Model performance was assessed using a variety of fit statistics, including the c-statistic. The c-statistic provides a summary measure of the predictive power of a model. A c-statistic value greater than 0.7 indicates good model fit, while a value greater than 0.8 indicates very good model fit. As shown below, all six models presented in this report exceeded the 0.7 threshold.

No Prior SUD Treatment in CY 2017 or 2018

- *Outpatient Treatment, 2019:* 0.75
- *Inpatient/Residential Treatment, 2019:* 0.78
- *Medication for Opioid Use Disorders, 2019:* 0.73

Received Any SUD Treatment in CY 2017 or 2018

- *Outpatient Treatment, 2019:* 0.79
- *Inpatient/Residential Treatment, 2019:* 0.78
- *Medication for Opioid Use Disorders, 2019:* 0.84

All standard errors are adjusted for the non-independence of observations within counties by clustering these data using PROC SURVEYLOGISTIC in SAS 9.4 (SAS Institute, Cary NC). Sensitivity analyses were conducted to determine if our results were affected by the selected modeling approach. Because geographic factors were expected to have a significant impact on client access to treatment, we estimated a series of additional statistical models to determine the degree to which the parameter estimates, and standard errors varied based on how different statistical models account for the nesting of clients within counties. Alternative approaches include fixed effects models estimated using PROC GLM and hierarchical generalized linear models estimated using PROC GLIMMIX.

The results of the sensitivity analyses were similar to those presented in the report. Combined with additional descriptive analyses (not shown here), our results indicate that: 1) the results presented in this report are robust to the modeling approach employed; 2) there is insufficient variation in treatment access across counties following the inclusion of the block- and county-level predictors to merit the use of these more complex and computationally intensive statistical methods; and 3) clustering the data within counties using PROC SURVEYLOGISTIC adequately adjusted the estimated standard errors, reducing the possibility of drawing inaccurate conclusions from the data.

Additional analyses were also conducted to determine if the inclusion of pregnant women in the data had an appreciable impact on our findings. Pregnant women are more likely to have continuous contact with medical providers over the course of their pregnancy and may be actively encouraged to access existing treatment services. Additionally, the range of potential services available to pregnant women may be more limited relative to other subpopulations, and the preferred course of SUD treatment may differ as well. Binary logit models that excluded pregnant women produced results substantively comparable to those that included these individuals, suggesting that the inclusion of a pregnancy flag as a statistical control adequately adjusted for the presence of pregnant women in our data.

DATA SOURCES

Data used in this report came from the integrated administrative data maintained in the Department of Social and Health Services (DSHS) Integrated Client Databases (ICDB; Mancuso 2014). The ICDB contains data from several state administrative data systems, including the state's ProviderOne MMIS data system that contains Medicaid claims and encounter data. The ICDB allows for the examination of a broad set of measures for Medicaid beneficiaries.

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MEASURES

Demographics. Demographics (age, race/ethnicity, and gender) were drawn from the ICDB using information from DSHS and state-administered health service systems.

Household Information. Household data are based on assistance unit (AU) information obtained from DSHS' Automated Client Eligibility System (ACES). In situations where a client belonged to multiple AUs in a month, these AUs are ranked based on the client's relationship to the head of household, financial responsibility code, and AU type. Clients are assigned to the AU that was most closely aligned with the concept of a household or family for that month.

Geography. Individuals were attributed to a given county based on residential address information collected from state administrative systems. A client was attributed to a county if they lived in that county for 11 of 12 months in CY 2018.

- **Urbanicity.** County urbanicity based on census tract-level population density and percent of each tract's population residing in an urbanized area. Clients were assigned to census tracts based on residential address information as of December 2018.

- **Accountable Communities of Health.** Clients were assigned to Accountable Communities of Health (ACHs) based on county of residence. A client was attributed to an ACH if they lived in the ACH's constituent counties for 11 of 12 months in CY 2018 The nine ACHs and their associated counties are listed below.

  - *Better Health Together:* Adams, Ferry, Lincoln, Pend Oreille, Spokane, and Stevens counties.
  - *Cascade Pacific Action Alliance:* Cowlitz, Grays Harbor, Lewis, Mason, Pacific, Thurston, and Wahkiakum counties.
  - *Elevate Health:* Pierce County.
  - *Greater Columbia ACH:* Asotin, Benton, Columbia, Franklin, Garfield, Kittitas, Walla Walla, Whitman, and Yakima counties.
  - *HealthierHere:* King County.
  - *North Central ACH:* Chelan, Douglas, Grant, and Okanogan counties.
  - *North Sound ACH:* Island, San Juan, Skagit, Snohomish, and Whatcom counties.
  - *Olympic Community of Health:* Clallam, Jefferson, and Kitsap counties.
  - *SWACH (Southwest Washington ACH):* Clark, Klickitat, and Skamania counties.

  If a client resided in an ACH for less than 11 months, the client was assigned to the "Unattributed" category.

- **Health Provider Shortage.** Measures of mental health and primary care provider shortages are based on data obtained from the 2018-2019 Area Health Resources File (Bureau of Health Professions, Health Resources and Services Administration 2019). Health provider shortages are determined using information on physician/medical professional-to-population ratios, service needs, under- or over-utilization of existing services, and the accessibility of healthcare services. Counties are classified as having no healthcare provider shortages, shortages that affect parts of the county, or countywide shortages.

- **Area Deprivation Index.** The Area Deprivation Index (ADI) is a standardized index constructed using poverty, housing, education, and employment indicators from the American Community Survey to capture information on the level of socioeconomic disadvantage present at the census block group level (Kind & Buckingham, 2019; Singh 2003). Block groups across the country are ranked by their ADI scores and then assigned to a percentile based on their ranking. In situations where a percentile score was unavailable for a given census block, we substituted the missing value with the mean percentile score for the census tract in which the block group was located.

Medical Coverage. Medicaid and other medical coverage data were obtained from eligibility codes recorded in ProviderOne.

Behavioral Health Indicators. Data from two information systems—ProviderOne (medical) and the Behavioral Health Data System (mental health and substance use disorders)— were used to identify the presence of SUDs and/or mental illness based on diagnoses, prescriptions, and treatment records. In addition, drug- and alcohol-related arrest data maintained by the Washington State Patrol were also used to identify probable substance use issues and were included in the definition of SUDs.

- **Substance Use Disorder.** A SUD is indicated for any individual who: 1) was diagnosed with an SUD; 2) had a prescription filled for medication for opioid or alcohol use disorder treatment; 3) received outpatient or inpatient SUD treatment services; or 4) was arrested for an SUD-related charge. Specific SUDs were identified using ProviderOne diagnosis information. Diagnoses were categorized based on the International Classification of Diseases (10th Revision) categories reported in Owens, Fingar, McDermott, Muhuri, & Hesline (2019).

- **Mental Health Disorder.** A mental health disorder is indicated for any individual who: 1) was diagnosed with a psychotic, mania/bipolar, depressive, anxiety, attention deficit and/or hyperactive, disruptive/impulse control/conduct, or adjustment disorder; 2) had an antipsychotic, antimania, antidepressant, antianxiety, or ADHD prescription filled; 3) received mental health services; or 4) received behavioral rehabilitation services from the Children's Administration.

  - **Serious Mental Illness.** Chronic Illness and Disability Payment System categories (Kronick et al. 2000) were used to split clients with co-occurring mental health and substance use disorders into two mutually exclusive subpopulations: 1) the serious mental illness ("SMI") population, which includes clients with diagnosed with a mental health disorder associated with the Psychiatric High, Medium, or Medium Low CDPS risk categories at any point in CY 2017 or 2018; and 2) the non-serious mental illness ("non-SMI") population, which includes clients with an indicated mental health disorder that did not fall into the one of these three risk categories in 2017 or 2018. Individuals were assigned to CDPS categories based on diagnosis data available in ProviderOne, the Behavioral Health Data System, and the DSHS Aging and Long-Term Support Administration's (ALTSA) CARE database. Example SMI diagnoses associated with the Psychiatric High, Medium, or Medium Low CDPS risk categories include schizophrenia, bipolar affective disorder, and major depressive disorder.

Chronic Illness Risk Score. An indicator of chronic illness was developed to identify individuals with significant health problems. A risk score equal to one is the score for the average Medicaid participant in Washington State meeting Supplemental Security Income disability criteria. Chronic illness risk scores were calculated from health service diagnoses and pharmacy claim information, with scoring weights based on a predictive model associating health conditions with future medical costs (*see* Gilmer et al., 2001; Kronick et al., 2000 for more information). Individuals were identified as having chronic illness if their risk score was greater than or equal to one.

Emergency Department Use and Hospitalizations in General Medical Settings. Emergency department and hospitalizations in general medical settings were identified from Medicaid claims and encounters in ProviderOne. The data do not include claims information for individuals with third-party liability coverage.

Outpatient Behavioral Health Service Encounters. Service encounter records in ProviderOne and the Behavioral Health Data System were used to track outpatient mental health services. Specific service modalities were identified using the Division of Behavioral Health and Recovery's (DBHR) Service Encounter Reporting Instruction (SERI) categories and Healthcare Common Procedure Coding Systems (HCPCS) codes and/or Current Procedure Terminology (CPT) codes. Service encounter records in ProviderOne and the Behavioral Health Data System were used to track outpatient substance use disorder services.

Inpatient Data. Information on client inpatient stays was obtained from the Health Care Authority's Provider One system, the Consumer Information System previously maintained by the DBHR, and state hospital records. Spans of inpatient service were transformed into a series of flags that indicated whether a client received treatment in an inpatient setting in a given month and year. These flags were then used to determine when a client exited an inpatient setting during the study period.

Access to Preventative/Ambulatory Health Services. Preventative and/or ambulatory heath service visits were identified using Medicaid claims data from ProviderOne claims data. A claim was categorized as a preventative/ambulatory visit if its procedure code appeared in the "Ambulatory Visit" or "Other Ambulatory" Healthcare Effectiveness Data and Information Set (HEDIS) value sets. These data do not include claims information for individuals with third-party liability coverage.
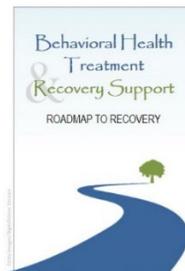
Arrests and Charges. Arrest and charge indicators were based on offenses reported to the Washington State Patrol (WSP), which include arrests for felonies, gross misdemeanors, and other offenses. WSP records arrests regardless of conviction status. Some less serious misdemeanor offenses or non-criminal infractions handled by local law enforcement agencies are not required to be reported in the WSP database and are not included in the analyses.

DSHS

Jail Bookings. Jail booking data is based on information from the Jail Booking and Reporting System (JBRS) as recorded in ProviderOne. This data is maintained by the Washington Association of Sheriffs and Police Chiefs (WASPC).

Public Assistance. Receipt of publicly funded financial assistance was identified using data from the ACES data summarized in the ICDB. Receipt of social services provided by divisions within DSHS (e.g., the Division of Vocational Rehabilitation Services, ALTSA, etc.) or other sister agencies (e.g., the Department of Children, Youth, and Families) are based on information obtained from ProviderOne, the Social Service Payment System, and/or agency-specific databases and summarized in the ICDB.

Housing and Homelessness Services. Receipt of homelessness and housing services is based on program information and service receipt data recorded in the Washington State Department of Commerce's Homeless Management Information System (HMIS).

Employment. Employer-reported data on quarterly employment status, earnings, and hours worked came from the Washington State Employment Security Department (ESD) Unemployment Insurance wage file. Individuals were flagged as employed if they had at least one quarter of non-zero earnings during CY 2018. The percentage of quarters employed was calculated as the ratio of the number of quarters that a client had non-zero earnings to the total number of quarters since either July 1997 or the date that they turned 14 and became eligible for employment, whichever came first.