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## Characteristics of patients with substance use disorder before and after the Affordable Care Act\*

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### Abstract

**Background:** The Affordable Care Act (ACA) offered an unprecedented opportunity to expand insurance coverage to patients with substance use disorders (SUDs). We explored the expectations of key stakeholders for the ACA's impact on SUD care, and examined how clinical characteristics of newly enrolled patients with SUD in a large healthcare delivery system differed pre- and post-ACA implementation.

**Methods:** In this mixed-methods study, qualitative interviews were conducted with health system leaders to identify themes regarding how the health system prepared for the ACA. Electronic health record data were used to examine demographics, as well as specific SUD, psychiatric, and medical diagnoses in cohorts of pre-ACA (2012, n=6066) vs. post-ACA (2014, n=7099) newly enrolled patients with SUD. Descriptive statistics and logistic regression models were employed to compare pre-ACA and post-ACA measures.

**Results:** Interviewees felt much uncertainty, but anticipated having to care for more SUD patients, who might have greater severity. Quantitative findings affirmed these expectations, with post-ACA SUD patients having higher rates of cannabis and amphetamine use disorders, and more psychiatric and medical conditions, compared to their pre-ACA counterparts. The post-ACA SUD cohort also had more Medicaid patients and greater enrollment in high-deductible plans.

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Contributors

All authors assisted in the conceptualization and design of the study. Campbell, Altschuler, Parthasarathy, and Satre conducted the literature searches and summaries of previous related work. Parthasarathy undertook the statistical analysis. Campbell wrote the first draft of the manuscript, which was revised and edited by all authors. All authors contributed to and have approved the final manuscript.

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Conflict of Interest

All authors declare that they have no conflicts of interest.

**Conclusions:** Post-ACA, SUD patients had more comorbidities as well as and more financial barriers to care. As federal healthcare policy continues to evolve, with potentially more restrictive coverage criteria, it is essential to continue examining how health systems adapt to changing health policy and its impact on SUD care.

## Keywords

Affordable Care Act; Substance Use Disorder; Mixed Methods; Electronic Health Record

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## 1. Introduction

The Patient Protection and Affordable Care Act (ACA)(U.S. Congress, 2010) significantly expanded insurance coverage choices for patients with substance use disorders (SUDs). Building on the legacy of parity legislation, which required that treatment for SUDs and other psychiatric conditions be covered on par with medical and surgical services (Abraham et al., 2017; Centers for Medicare and Medicaid Services), the ACA mandated that SUD treatment be included as an “essential benefit” in the health benefit plans offered on the state and federal exchanges. It also extended parity to small group and individual health plans (U.S. Congress, 2010). In addition, the expansion of Medicaid and the elimination of exclusions for pre-existing conditions meant that considerably more individuals with SUDs, previously ineligible for Medicaid or private insurance, had the opportunity to obtain health coverage.

These key ACA mandates (Beronio et al., 2014; McCance-Katz et al., 2014) were projected to change the insured population’s composition (e.g., more Medicaid patients and more complex patients with chronic conditions), heighten demand for health services, and increase use of deductible plans (Ali et al., 2016; Busch, 2012; Busch et al., 2013; Mark et al., 2015; McLellan and Woodworth, 2014) after implementation in 2014. Yet, few studies have empirically examined whether and how SUD patient populations with new healthcare coverage changed following implementation. One study in a nationally representative sample of U.S. adults found that insurance coverage increased among patients with both psychiatric disorders and SUDs, although SUD coverage was not examined separately (Creedon and Cook, 2016). A study of SUD treatment programs found increased treatment referrals from healthcare providers, more physicians on staff, and more certified treatment counselors, suggesting shifts aligned with ACA goals for integrated SUD and medical care (Aletraris et al., 2017). Changing characteristics of the insured population could have significant implications for increased demands on resources. Additionally, conceptual frameworks from the fields of implementation and organizational science highlight how changes in the external environments (e.g., public policy) necessitate responses from organizations (Birken et al., 2017; D’Aunno and Vaughn, 1995; Damschroder et al., 2009).

Given the potential impact of key ACA mandates (e.g., Medicaid expansion, elimination of pre-existing condition exclusion, parity extension, SUD treatment as an essential benefit), we hypothesized that the health system would anticipate possible changes in SUD patient mix and respond by planning accordingly. We employed a mixed-methods approach, using both qualitative and quantitative methods to obtain a comprehensive perspective on changes

potentially related to the ACA in a large integrated healthcare system, Kaiser Permanente Northern California (KPNC). We utilized in-depth, semi-structured interviews to explore clinical and health plan leaders' expectations and planning for SUD care related to ACA implementation in 2014. The qualitative methods allowed us to identify changes leaders expected related to the ACA and how they prepared (Pluye and Hong, 2014). Next, the quantitative methods used electronic healthcare data to compare demographic and clinical characteristics and health coverage of patients with SUD pre- and post-ACA (2012 vs. 2014) to evaluate whether these expectations were met. Due to the 2014 ACA mandates, we anticipated that the post-ACA cohort would be more complex (have more medical conditions), implying greater clinical needs than the pre-ACA cohort (Collins et al., 2017; Magge et al., 2013).

The qualitative and quantitative approaches were sequential, with qualitative interviews conducted primarily prior to ACA enrollment to address questions related to planning for early implementation, while the quantitative analyses reflected post-ACA outcomes (Palinkas, 2014; Palinkas et al., 2011). The qualitative work was embedded in the overall project so we could use the qualitative findings in a complementary fashion to better understand the quantitative results (Palinkas, 2014; Palinkas et al., 2011).

## 2. Methods

### 2.1. Setting

KPNC is an integrated healthcare delivery system serving approximately 4 million members (45% of the commercially insured population in the region). The membership is racially and socio-economically diverse and representative of the demographic characteristics of the geographic area (Gordon, 2015; Selby et al., 2005). SUD treatment is provided in specialty clinics within KPNC. The group-based treatment philosophy is predominantly based on abstinence and is representative of treatment programs nationwide. Group sessions are led by psychologists and clinical social workers and include supportive group therapy, education, cognitive behavioral therapy, and family-oriented therapy. Patients are not separated based on treatment for alcohol vs. other SUDs. Individual counseling, physician appointments, and pharmacotherapy are also available. Treatment is daily or 4x/week, depending on severity, for 9-weeks, and includes regular 12-step meetings off-site. A follow-up phase of weekly meetings is available up to one-year post-intake (Satre et al., 2004). Study procedures were approved by the KPNC and the University of California, San Francisco, Institutional Review Boards.

### 2.2. Qualitative Methods

**2.2.1 Sample.**—Between October 2013–February 2014, we conducted in-depth, semi-structured interviews with 15 KPNC clinical leaders (e.g., Physicians in Chief of medical centers, SUD treatment program directors) and 14 KPNC operational leaders (e.g., Associate Executive Director for Government Relations, Vice President for Health Plan Operations). Interviews were conducted by study authors in two-person teams, comprised of either CC/AA or DS/AA. We used purposive sampling and identified key informants who had expertise in ACA-related planning and/or SUD treatment in the health system. We identified

the sample based on our existing knowledge of clinical and operational leaders. In addition, a Senior Medical Director provided names of leaders engaged in ACA implementation. Two additional participants were suggested by original interviewees. Our target sample was N=30, and one individual declined, stating a lack of time. In the final sample of 29 interviewees, we were able to achieve saturation in several domains such as expectations about the characteristics of new enrollees.

**2.2.2 Interviews.**—Based on the literature, we developed an interview guide that covered the main domains of interest for both clinical and operational leaders, with relevant follow-ups and probes specific to each type of leader as appropriate (Appendix A)<sup>1</sup>. Questions focused on ACA-related planning relevant to SUD patients: Perceptions of the ACA within the context of California and the U.S. healthcare environment, organizational responses to the ACA including new insurance products; anticipated changes in membership; awareness of SUD coverage as an element of ACA policy, and expected impact of the ACA on SUD care. Interviews were conducted in-person for 25 respondents and by phone for 4, lasted approximately 45 minutes, and were digitally recorded and transcribed.

**2.2.3 Analysis.**—Coding, developed from the content of the fielded questions, field notes, and transcript review (Miles et al., 2014), included broad themes, e.g., “overall expectations regarding new members” and subthemes such as “anticipated patient characteristics”. After establishing the final set of codes, each investigator applied the codes to a sub-sample of four transcripts, and the investigators then discussed the results. After establishing consensus on definitions, the remaining coding was completed by AA and reviewed and checked by the other investigators. All discrepancies (<15%) were resolved by consensus. Our analysis involved an iterative, inductive process that included the drafting of notes, codes, and themes and drew from inductive theme analysis techniques (Luborsky, 1994) in order to generate insights into how ACA implementation might affect the care of patients with SUD (Tong et al., 2007). As in previous studies (Satre et al., 2016; Zhang and Creswell, 2013), we analyzed qualitative and quantitative data separately and integrated the results during interpretation.

## 2.3. Quantitative Methods

**2.3.1 Data Sources.**—We extracted data from KPNC’s electronic health record (EHR), which has comprehensive demographic, membership, and diagnostic data, linked with a unique patient identifier.

**2.3.2 Sample.**—The pre-ACA study sample included adults aged 18-64 who were newly enrolled in KPNC between 1/1/2012-12/31/2012 and who had a documented SUD diagnosis within 1-year of enrollment; new enrollees were defined as members who were not enrolled in KPNC in the prior 6-months. We focused on new enrollees based on the premise that differences between the pre- and post-ACA period would be more apparent among first-time enrollees than in the overall SUD membership. We excluded individuals aged 65 and above

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because Medicare enrollees are less directly impacted by the ACA. The post-ACA sample consisted of new members in the period 1/1/2014–12/31/2014 with a SUD diagnosis within one year of enrollment. International Classification of Diseases, Version 9, (ICD-9) codes of 291, 292, 303-305 (excluding 305.1 of tobacco dependence) and ICD-10 codes of F10-F19 were used to identify SUDs; those with tobacco dependence diagnosis only were excluded. We excluded 2013 enrollees from sample selection to minimize possible contamination from early adoption of ACA-related changes.

## 2.4. Measures

**2.4.1 Demographics.**—Sex, age, and race/ethnicity were obtained from the EHR and linked using unique identifiers.

**2.4.2 Types of SUD.**—We compared the overall prevalence of SUDs among new enrollees as well as by type of substance disorder (e.g., alcohol, tobacco, cannabis, amphetamines, cocaine, opioids, hallucinogens and sedatives).

**2.4.3 Comorbidity.**—Comorbidities were identified through ICD-9/ICD-10 codes recorded in the EHR within 1-year of enrollment. They were grouped into: *a) co-occurring medical conditions* found to be common among SUD patients (acid-related disorders/acid peptic, arthritis, asthma, chronic kidney disease, COPD, chronic pain, lower back pain, congestive heart failure, coronary atherosclerosis, diabetes, end-stage renal disease, epilepsy, headaches, hypertension, injuries and poisonings, ischemic heart disease, liver cirrhosis, obesity, osteoporosis, pneumonia, Parkinson's, stroke, viral hepatitis B and C, HIV) (Mertens et al., 2003; Satre et al., 2016); and *b) psychiatric disorders* that are regulated by California mental health parity law (bipolar disorder, depressive disorders, developmental disorders, eating disorders, obsessive-compulsive and panic disorders, and schizophrenia) (Disability Rights California, 2014), plus anxiety disorders.

**2.4.4 Type of Insurance Coverage.**—Insurance coverage was classified as Commercial, Medicaid, and other (e.g., other government subsidy programs) status, ascertained from the membership database.

**2.4.5 Deductible Limits and ACA Exchange plans.**—Deductible limits were categorized into 3-levels (none, 1-\$999 and \$1000). Deductibles are features across different benefit plans, including commercial plans, but are more common in ACA benefit plans. For post-ACA enrollees we obtained *tiered metal plan data* (Bronze, Silver, Gold, and Platinum) that are sold on the California state insurance exchange; cost-sharing (e.g., co-payments and deductibles) decreases from Bronze to Platinum (Centers for Medicare and Medicaid Services; Covered California, 2017).

## 2.5. Quantitative Data Analyses

We compared demographic characteristics of the pre- and post-ACA cohorts using chi-squared tests of bivariate frequencies for categorical variables and t-tests for continuous measures. We used logistic regression to compare rates of specific SUDs (alcohol, tobacco, opioids, amphetamines, sedative/hypnotics, hallucinogens, and cannabis), psychiatric and

medical SUD-related conditions between the pre- and post-ACA cohorts in the 12-months after enrollment, controlling for age, gender and race/ethnicity. The coefficient of interest was the indicator variable for the cohort (pre-ACA=0, post-ACA=1). To adjust for multiple comparisons (35), we set a threshold for statistical significance at  $p < 0.001$  using a conservative Bonferroni correction (Westfall et al., 2010). All analyses were conducted using SAS® (Cary, NC).

### 3. Results

#### 3.1. Qualitative Results

**3.1.1 Planning for Changes in SUD Treatment.**—Clinical and operational leaders described planning for SUD treatment within the larger context of anticipated growth in general membership enrollment and demand for services post-ACA. ACA-mandated benefits for SUD care were similar to those KPNC already offered (except for the majority of the Medicaid population, for whom counties provide SUD treatment services). However, a new change was the inclusion of coverage for methadone treatment in the post-ACA period, which was the result of KPNC's participation in the state insurance exchange.

Respondents indicated that although preparing for ACA implementation was a huge undertaking for the health system, other issues in the broader healthcare environment were occurring simultaneously that also demanded attention. These included an increasingly competitive local healthcare marketplace and challenges for Medicaid patients who would receive SUD treatment in county systems but all other health services within KPNC. While this historical arrangement was not directly related to the ACA, interviewees anticipated that increased Medicaid membership due to the Medicaid expansion would result in more patients facing this barrier to integrated treatment.

**3.1.2 Uncertainty Regarding Membership Growth and New Enrollee Needs.**—Uncertainty regarding membership growth was a common theme among respondents. Too few new members might jeopardize KPNC's financial stability, but too many might overwhelm healthcare providers. However, an increase in service demand was viewed as a lesser problem for SUD clinics, because treatment is largely group-based, allowing flexibility in integrating new patients. Respondents felt that newly-enrolled members with SUDs might have higher severity, including more co-occurring psychiatric disorders and social problems, requiring additional resources and more services. Clinical respondents anticipated an increased need for case management to connect patients with necessary services. Although some of the larger clinics hired additional clinicians to prepare for potential enrollment growth, for the most part, leaders planned to increase staffing as needed once implementation occurred.

**3.1.3 Cost-Sharing and Consumer Experience.**—Given the reliance of the ACA on high-deductible benefit plans, respondents expected a growing proportion of SUD patients to have high deductible benefit plans and higher out-of-pocket expenses. SUD clinicians indicated that they were already seeing more patients with deductible plans with greater cost-sharing before ACA implementation. Clinicians voiced concern about this increasing burden on patients and the impact on access to care and clinical relationships. Further,

respondents expected that members who paid directly out-of-pocket for health services would have higher expectations for customer service. As part of an overall health system initiative to address rising consumer expectations, all staff and clinicians, including SUD clinicians, participated in region-wide employee training emphasizing the competitive marketplace facing KPNC, and the importance of focusing on the consumer experience (e.g., attentive customer service, orderly waiting rooms, etc.).

### 3.2. Quantitative Results

**3.2.1 Demographic Characteristics.**—Overall member enrollment in KPNC grew, resulting in sample sizes for the pre- and post- ACA cohorts of new members with SUD of  $n=6066$  (1.4%) and  $n=7099$  (1.3%), respectively (Table 1). The post-ACA cohort had more women (38.8% vs. 35.0%;  $p < .01$ ), and was older (mean age = 38.3 vs. 36.8 years;  $p < .01$ ). Compared to the pre-ACA cohort, the post-ACA cohort had a higher proportion of Blacks (13.2% vs. 11.4%,  $p=.01$ ) and a lower percentage of Hispanics (16.7% vs. 18.0%;  $p=.01$ ).

**3.2.2 Insurance Coverage and Deductibles.**—The post-ACA cohort was more likely to be enrolled in deductible plans than the pre-ACA cohort (31.4% vs. 19.2% overall,  $p<.01$ ) and had a significantly greater proportion of Medicaid members (18.3% vs. 6.7%,  $p<.01$ ) (Table 1).

Among the post-ACA SUD cohort, 14.3% ( $n=1007$ ) were enrolled via the California health insurance exchange. Among exchange enrollees, 71.0% had a deductible plan compared with 24.0% among non-exchange enrollees ( $p<.01$ ); exchange enrollees also had a higher percentage of individuals with deductible levels  $> \$1,000$  (42.5% vs. 17.8%;  $p < .01$ ). Post-ACA exchange enrollment in metal plans was as follows: Bronze (23.0%) Silver (63.0%), Gold (4.7%), Platinum (8.9%), and Catastrophic (0.5%) (not shown).

**3.2.3 SUD Diagnoses.**—The post (vs. pre) ACA cohort had a higher prevalence of (Table 2) amphetamine (11.8% vs. 9.1%,  $p<.001$ ), and cannabis use disorder diagnoses (29.3% vs. 27.6%,  $p<.001$ ). Sedative/hypnotics (3.9% vs. 3.1%,  $p=.06$ ) and tobacco dependence were marginally higher in the post-ACA cohort (37.7% vs. 35.9%,  $p=.06$ ).

**3.2.4 Comorbidities.**—Overall, the post-ACA cohort had significantly higher rates of psychiatric conditions (Table 2); depressive disorders were significantly higher among the post-ACA cohort (35.4% vs. 31.6%,  $p=.001$ ) as was anxiety disorder (35.0% vs. 29.6%,  $p<.001$ ).

The post-ACA SUD cohort was significantly more likely to have at least one major medical condition, (75.3% vs. 71.0%;  $p<.001$ ) (Table 3). The post-ACA cohort also had significantly higher rates of several specific comorbidities such as coronary atherosclerosis disease (5.3% vs. 1.9%), diabetes (7.9% vs. 5.8%), injuries and poisoning (40.7% vs. 35.6%) liver cirrhosis (7.2% vs. 4.2%), obesity (17.4% vs. 14.1%), and stroke (2.5% vs. 0.9%) (all  $p$ -values $<.001$ ). Chronic pain (30.6% vs. 27.6%), headaches (14.2% vs. 12.1%), pneumonia (3.1% vs. 2.1%), and congestive heart failure (2.3% vs. 1.5%) were marginally significant ( $p<.05$ ).



## 4. Discussion

The ACA provided a timely opportunity to learn how health systems prepare for significant healthcare policy that has the potential to alter the composition of patient populations receiving healthcare coverage. Three key elements of the ACA were expected to have a substantial impact on patient populations with SUD: Medicaid expansion, elimination of exclusions for pre-existing conditions, and the inclusion of SUD treatment as an essential benefit. To that end, this study examined ACA-related changes anticipated by key leaders in the health system relevant to SUD care as well as differences in the characteristics of newly enrolled SUD patients pre- and post-ACA implementation.

Taken together, much of leaders' expectations for changes in the patient population was supported by the quantitative analyses, which showed an increased number of new members with SUDs post-ACA. However, the overall percentage of new members with SUDs did not differ over time because of the large increase in overall enrollment in the health system post-ACA. The post-ACA SUD patient cohort was slightly older on average, with more women and African Americans, but fewer Hispanic patients.

As expected based on Medicaid expansion and the qualitative interview findings, the post-ACA cohort included significantly more patients with Medicaid compared to pre-ACA. This growth is consistent with national (Antonisse et al., 2017) and California (Kirzinger et al., 2016) Medicaid growth post ACA. While California participated in the Medicaid 1115 waiver program to expand coverage to low-income adults prior to 2014, Medicaid enrollment through the ACA continued to increase considerably after January 2014, with approximately 3 million more Californians enrolled in Medicaid by October 2016 (Antonisse et al., 2017; California Department of Healthcare Services and Research and Analytic Studies Division, 2017; Norris, 2017; Sommers et al., 2016; Sommers et al., 2018). Historically, county healthcare systems have provided SUD treatment to KPNC Medicaid members, while medical care is provided within KPNC. Therefore, although increased coverage for the Medicaid population reflects a positive impact of the ACA, the coordination of SUD care with other health services for this patient population remains a challenge.

It was somewhat unexpected that the percent of Hispanic SUD patients post-ACA was lower, given that Medicaid coverage was higher among post-ACA SUD new members, and overall in California Hispanics have experienced considerable growth in Medicaid coverage (Dietz et al., 2016). It is possible that challenges in accessing specialty SUD treatment (where SUD diagnoses are more likely to be assigned vs. other clinics) for new Hispanic patients with SUD post-ACA were greater than pre-ACA. This could be due to more complex health conditions that take priority to treat, less health literacy and ability to navigate the health system, or language constraints, as has been found in previous research (Guerrero et al., 2013).

An important provision of the ACA was the establishment of state and federal insurance exchange marketplaces. Although there had been a growing trend of plans with high deductibles even pre-ACA, the ACA benefit plans made deductibles a more common feature. Post-ACA SUD enrollees were much more likely to have high-deductible plans,

which have lower premiums but higher patient costs for actual use of services. High deductibles have been shown to negatively impact the utilization of a range of services, including SUD treatment (Lo Sasso and Lyons, 2002, 2004; Stein and Zhang, 2003). Further, outpatient SUD treatment models often require attendance multiple days per week for several weeks, which can be expensive for patients when co-payments are required. It is critical to assess how these patients fare over the long term and examine access to needed services. This is particularly relevant for younger individuals, who are more likely to have SUDs and who are also more likely to opt for deductible plans. It remains to be seen to what extent the potential of the ACA to increase access to care is realized in the face of high deductible plans, which are likely to inhibit care-seeking behavior.

The post-ACA SUD population had a significantly higher prevalence of amphetamines and cannabis use disorder. This may suggest more polysubstance use, and potentially higher treatment need, which would support the expectations of interviewees who anticipated pent-up demand from new members. The potential for increased demand for SUD care was not generally seen as a problem by treatment providers because of the group-based KPNC outpatient treatment model and its flexibility in accommodating more patients. This differs from a study of clinical leaders of public addiction treatment programs in Los Angeles County interviewed in 2013 (Guerrero et al., 2017). There was a similar expectation about the patient population's addiction severity changing, but greater concern about being overwhelmed. The difference may reflect KPNC clinical leaders having more resources as part of a larger, private health system. Given the recent legalization of cannabis use in California (Vote California, 2016), cannabis use disorder prevalence may continue to increase.

Interviewees also anticipated the possibility of serving a patient population with more psychiatric and medical conditions due to the ACA's elimination of pre-existing conditions exclusion, which was supported in the quantitative findings. This suggests that providers may encounter a higher demand for care for depression and anxiety, with corresponding growth within SUD treatment programs for dually diagnosed patients, and indeed KPNC has increased hiring of mental health providers in recent years (Kaiser Permanente, 2017). Higher prevalence of medical conditions such as injuries/poisoning, hypertension, and obesity suggested potentially greater demand on the health system. Although marginally significant, the signal that more patients had pain diagnoses is particularly relevant given the ongoing opioid crisis (Rudd et al., 2016), and an increasingly conservative prescribing environment (Dowell et al., 2016). The ACA emphasizes integrated SUD and medical care, with implications for improved care of SUD patients. Quinn et al. interviewed leaders of SUD treatment organizations in Massachusetts in 2014. Many organizations responded to the ACA by developing linkages to general medical providers to expand services and to integrate care. Whether SUD patients with comorbidity are more likely to access healthcare services is important to examine in future research.

#### 4.1. Limitations

Quantitative analyses examined new enrollees in 2012 and 2014. Although the timing for the cohort selection corresponds to pre- and post-ACA enrollment, other dynamics in the

environment during that timeframe could have also contributed to the results. The study was conducted in a single health system in Northern California, thus potentially limiting generalizability, although several system characteristics, such as deductible plans, are generalizable to other systems of care (The Henry J. Kaiser Family Foundation, 2016). We did not have income data, which might influence whether members have high deductible plans, and raise their risk of SUDs and comorbidity. Selection of participants and examination of comorbidity relied on provider-assigned diagnoses. SUD diagnoses are most likely to be assigned in SUD treatment, and thus may underrepresent patients who face barriers to treatment (e.g., Hispanic patients). The study was not designed to qualitatively examine patient experiences with ACA enrollment, an area for future research. Healthcare reform continues to evolve, and changes to the ACA and SUD treatment policy at the state and local levels are likely to have impacts on future trends in SUD insurance access and treatment.

## 4.2. Conclusion

The ACA contained critical policy changes with the potential to greatly expand coverage and improve access to treatment for patients with SUDs. This study indicated more patients with SUDs enrolled in a large, healthcare delivery system, suggesting the ACA may be fulfilling its potential. Findings provide valuable insights into the process of planning for ACA implementation, and into how SUD patients enrolling in coverage may be different post-ACA. The post-ACA SUD population in this health system had more SUDs, health conditions, and deductible plans, suggesting potentially greater patient needs and challenges. The future of the ACA is uncertain, and recent findings suggest that national insurance coverage gains have been reversed (Sommers et al., 2018). It is likely that coverage for SUDs will continue to be a focus in future health policy debates, given the opioid crisis and increasing legalization of cannabis use. In this changing healthcare landscape, future research should continue to examine insurance coverage for patients with SUD, including the association with race/ethnicity and Medicaid expansion, to understand access to care.

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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**Highlights**

- Stakeholders reported high uncertainty, but expected more complex patients post-Affordable Care Act (ACA)
- New substance use disorder (SUD) patients after the ACA had more medical and psychiatric condition diagnoses
- High deductible plans were more common after the ACA among new SUD patients

**Table 1.**

Characteristics of Pre- and Post-ACA SUD Cohorts

	Pre-ACA		Post-ACA		P-value
	(N=6066)	%	(N=7099)	%	
Gender					
Female	2125	35.0%	2738	38.8%	<.01
Male	3941	65.0%	4321	61.2%	
Race/Ethnicity					
White	3546	58.5%	4116	58.0%	0.01
Black	691	11.4%	934	13.2%	
Asian	376	6.2%	414	5.8%	
American Indian/Alaskan Native	69	1.1%	79	1.1%	
Native Hawaiian/Pacific Islander	54	0.9%	50	0.7%	
Hispanics	1092	18.0%	1182	16.7%	
Unknown	238	3.9%	324	4.6%	
Age					
< 30	2134	35.2%	2179	30.7%	<.01
30-39	1544	25.5%	1840	25.9%	
40-49	1183	19.5%	1390	19.6%	
50-59	954	15.7%	1272	17.9%	
=> 60	251	4.1%	418	5.9%	
Mean Age (Std/Dev.)	36.8 (12.3)		38.3 (12.5)		< .01
Deductible Level *					
None	4456	80.9%	4344	68.5%	<.01
\$1 - \$999	241	4.4%	616	9.7%	
=> \$1000	813	14.8%	1377	21.7%	
Coverage Type					
Commercial	5039	91.5%	5109	80.6%	<.01
Medicaid	368	6.7%	1158	18.3%	
Other	103	1.9%	70	1.1%	
Exchange Members	--	--	1007	14.3%	

\* Does not add up to full sample size due to missing values

Enrolled in 2012 (pre-ACA) and 2014 (post-ACA); SUD diagnosis within 12 months of enrollment.



**Table 2.** Logistic Regression Models of Psychiatric and Substance Use Disorders Comparing Pre- and Post-ACA SUD Cohorts

	Pre-ACA		Post-ACA		Adjusted OR	95% Confidence Limits		Pr > X <sup>2</sup>
	(N=6066)	(%)	(N=7099)	(%)		OR	Limits	
Substance Use Disorder Diagnoses								
Alcohol	3499	57.7%	4113	57.9%	0.98	(0.915, 1.058)	0.6537	
Amphetamines*	554	9.1%	837	11.8%	1.34	(1.193, 1.504)	<0001	
Sedative/hypnotics	189	3.1%	275	3.9%	1.21	(0.996, 1.465)	0.0547	
Cocaine	278	4.6%	368	5.2%	1.07	(0.909, 1.262)	0.4131	
Cannabis*	1673	27.6%	2077	29.3%	1.16	(1.073, 1.261)	0.0003	
Opioids	891	14.7%	1074	15.1%	1.04	(0.940, 1.146)	0.4576	
Tobacco	2175	35.9%	2676	37.7%	1.07	(0.997, 1.154)	0.0603	
Mental Health Diagnoses								
Schizophrenia	153	2.5%	184	2.6%	1.02	(0.814, 1.274)	0.8717	
Bipolar spectrum	726	12.0%	937	13.2%	1.09	(0.982, 1.216)	0.1049	
Depressive disorders*	1915	31.6%	2510	35.4%	1.14	(1.052, 1.227)	0.0011	
Panic disorder	271	4.5%	340	4.8%	1.07	(0.908, 1.269)	0.4042	
Obsessive-compulsive	54	0.9%	59	0.8%	0.98	(0.668, 1.422)	0.8946	
Anxiety*	1794	29.6%	2487	35.0%	1.28	(1.183, 1.381)	<0001	
Any mental health disorder*	3154	52.0%	4091	57.6%	1.24	(1.148, 1.329)	<0001	

\* =p<.001

OR=Odds Ratio

Models adjusted for sex, age, and race/ethnicity

**Table 3.**

Logistic Regression of Medical Conditions Comparing Pre- and Post-ACA SUD Cohorts

Medical Condition	Pre-ACA		Post-ACA		Adjusted OR	95% Confidence Limits	Pr > X <sup>2</sup>
	(N)	(%)	(N)	(%)			
Acid disorders	170	2.8%	228	3.2%	1.11	(0.907 , 1.368)	0.3023
Asthma	728	12.0%	947	13.3%	1.11	(0.995 , 1.229)	0.0613
Chronic kidney disease	116	1.9%	156	2.2%	1.04	(0.811 , 1.344)	0.7368
Chronic/lower back pain	1676	27.6%	2169	30.6%	1.10	(1.017 , 1.19)	0.0174
Congest hrt failure	93	1.5%	163	2.3%	1.41	(1.082 , 1.834)	0.0108
COPD	281	4.6%	364	5.1%	1.00	(0.852 , 1.184)	0.9607
Coronary atherosclerosis disease *	113	1.9%	376	5.3%	2.81	(2.248 , 3.523)	<.0001
Diabetes *	352	5.8%	561	7.9%	1.31	(1.131 , 1.512)	0.0003
Epilepsy	153	2.5%	162	2.3%	0.86	(0.685 , 1.077)	0.1865
Headaches	733	12.1%	1006	14.2%	1.16	(1.04 , 1.284)	0.0071
Hepatitis b	23	0.4%	34	0.5%	1.22	(0.712 , 2.099)	0.4671
Hepatitis c	187	3.1%	279	3.9%	1.13	(0.929 , 1.375)	0.2219
HIV	57	0.9%	86	1.2%	1.28	(0.914 , 1.804)	0.149
Hypertension	1254	20.7%	1581	22.3%	0.97	(0.879 , 1.067)	0.5133
Injury and poisoning *	2157	35.6%	2890	40.7%	1.24	(1.157 , 1.337)	<.0001
Ischemic heart disease	159	2.6%	244	3.4%	1.20	(0.976 , 1.486)	0.083
Liver cirrhosis *	252	4.2%	510	7.2%	1.70	(1.453 , 1.999)	<.0001
Obesity *	858	14.1%	1235	17.4%	1.21	(1.098 , 1.335)	0.0001
Osteoporosis	29	0.5%	43	0.6%	1.05	(0.646 , 1.713)	0.8381
Pneumonia	130	2.1%	221	3.1%	1.36	(1.092 , 1.704)	0.0062
Stroke *	57	0.9%	179	2.5%	2.43	(1.796 , 3.301)	<.0001
Any medical conditions *	4304	71.0%	5349	75.3%	1.20	( 1.100 , 1.297)	<.0001

\* = p &lt; .001

OR=Odds Ratio

Models adjusted for sex, age, and race/ethnicity