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**Title: The impact of COVID-19 on trends in alcohol use disorder treatment in Veterans Health Administration**

**Running Title: COVID-19 alcohol disorder treatment trends**

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**Abbreviations:** AUD = alcohol use disorder, ICD-10 = International Classification of Diseases, 10th Revision, CPT = Current Procedural Terminology, VHA = Veterans Health Administration, MH= Mental Health, SMI = serious mental illness, PTSD = post-traumatic stress disorder; FDA = Food and Drug Administration

## **Abstract**

**Background and Aims:** The COVID-19 pandemic disrupted healthcare provision in the United States and prompted increases in telehealth-delivery of care. This study measured alcohol use disorder (AUD) treatment trends across visit modalities before and during COVID-19.

**Design, Setting, Participants and Measurements:** We conducted a national, retrospective cohort study with interrupted time series models to estimate the impact of COVID-19 on AUD treatment in the Veterans Health Administration (VHA) in the United States, during pre-COVID-19 (March 2019 to February 2020) and COVID-19 (March 2020 to February 2021) periods. We analyzed monthly trends in telephone, video and in-person visits for AUD treatment and compared patient and treatment characteristics of patients receiving AUD treatment between the pre-COVID-19 and COVID-19 periods. AUD was defined using International Classification of Diseases, 10th

Revision (ICD-10) codes for alcohol abuse (F10.1) and alcohol dependence (F10.2) which have previously been used to study AUD in VHA.

**Findings:** The predicted percentage of VHA patients with an AUD diagnosis receiving any AUD treatment at the beginning of the pre-COVID period was 13.8% (n=49,494). The predicted percentage decreased by 4.3% (P=0.001) immediately at the start of the COVID-19 period due to a decline in AUD psychotherapy. Despite an increase of 0.3% per month (P=0.026) following the start of COVID-19, the predicted percentage of VHA patients with an AUD diagnosis receiving any AUD treatment at the end of the study period remained below the pre-COVID-19 period. In February 2021, AUD psychotherapy visits were primarily delivered by video (50%, 58,748), followed by in-person (36.6%, 43,251) and telephone (13.8%, 16,299), while AUD pharmacotherapy visits were delivered by telephone (38.9%, 3,623) followed by in-person (34.3%, 3,193) and video (26.8%, 2,498) modalities. Characteristics of VHA patients receiving AUD treatment were largely similar between pre-COVID-19 and COVID-19 periods.

**Conclusions:** Despite increased telehealth use, the percentage of US Veterans Health Administration patients with an alcohol use disorder (AUD) diagnosis receiving AUD treatment declined during COVID-19 (March 2020 to February 2021) mainly due to a decrease in psychotherapy.

**Keywords:** Alcohol use disorder, Veterans, COVID-19, telehealth

## **BACKGROUND**

Alcohol-related deaths were on the rise prior to 2020(1, 2), and accelerated during the novel SARS-CoV-2 (COVID-19) pandemic(3, 4). The increase in alcohol-related mortality during COVID-19 suggests a decrease in AUD treatment utilization and/or an increase in treatment need that has not been met in this vulnerable population. Several studies have found an increase in alcohol

use, including hazardous alcohol use, during COVID-19(5-8) and adverse alcohol-related health outcomes(9). However, there has been limited understanding of AUD treatment utilization during COVID-19.

COVID-19 has had widespread impacts on healthcare delivery and use(10, 11). To reduce COVID-19 exposure in health care environments, United States federal policy changes were implemented in March 2020 that expanded telehealth(12), including both video and telephone-only visits to patients at home. Prior work has found that expanded use of telehealth supported sustainment of medication treatment for opioid use disorder after the start of the pandemic(13, 14). However, further studies are needed to understand the impact of COVID-19 on treatment utilization in patients with AUD and other substance use disorders, particularly those where effective treatments include both medication and psychotherapies. Telehealth in AUD care has been examined to a limited extent in single center studies to assess patient satisfaction, change in alcohol use and treatment attendance(15-20). However, to our knowledge there are no studies examining changes in receipt of telehealth and other modalities of AUD care during the COVID-19 pandemic in large healthcare systems. Research examining trends in AUD care across telehealth modalities, including telephone and video, and changes in the characteristics of patients who are receiving treatment during the COVID-19 pandemic could help identify care and treatment gaps.

The Veterans Health Administration (VHA) is the largest integrated health system in the United States and is the largest addiction treatment provider in the country. Substance use disorder care is a VHA priority(21). The objective of this study was to estimate the impact of COVID-19 on AUD treatment across a national sample of Veterans receiving care in VHA with an AUD diagnosis. Herein we compare shifts in delivery modalities and patient characteristics of those seeking AUD treatment before and during COVID-19.

## **METHODS**

In this retrospective cohort study, we examined United States national VHA data to compare trends in AUD treatment (psychotherapy and pharmacotherapy) across the 12 months before and after the start of COVID-19 in the United States. The “pre-COVID-19” period was defined as the 12 months from March 2019 through February 2020, and the “COVID-19” period was defined as the 12 months from March 2020 through February 2021. The COVID-19 pandemic was declared as a national emergency by the President of the United States on March 13, 2020. Data were obtained from VHA’s Corporate Data Warehouse, a relational database that contains the VHA’s electronic health records including demographics, outpatient and inpatient visits, and pharmacy data including all medication fill data that has been used for VHA patients (22-24). This study was deemed exempt from review by the VA Ann Arbor Healthcare System Institutional

Review Board and followed the Strengthening of Reporting of Observational Studies in Epidemiology Statement (STROBE, see supplement) checklist(25).

### **Cohort Definition**

There were two approaches to defining cohorts in this study. The first was comprised of monthly rolling cohorts of VHA patients with AUD diagnoses to examine changes in overall treatment use and treatment use by modalities across months during the two periods (pre-COVID-19 and COVID-19). Patients in each monthly cohort included VHA patients age  $\geq 18$  years with at least one VHA outpatient encounter with an AUD diagnosis (either primary or secondary) in the 12 months prior to and including the month of interest. AUD was defined using International Classification of Diseases, 10th Revision (ICD-10) codes for alcohol abuse (F10.1) and alcohol dependence (F10.2) which have previously been used to study AUD in VHA(26-28). The second cohort was comprised of patients who received any AUD treatment in the pre-COVID-19 and COVID-19 periods to assess for changes in patient characteristics and number of AUD treatment visits between the pre-COVID-19 and COVID-19 periods.

### **Outcomes**

An AUD treatment visit was defined as: 1) AUD psychotherapy visit, classified as group or individual psychotherapy visit for AUD using Current Procedural Terminology (CPT) codes and VHA stop codes (see Supplement Table), and/or 2) AUD pharmacotherapy visit when the provider



for the AUD visit was the same as the prescriber for a Food and Drug Administration (FDA)-approved medication for AUD (i.e., naltrexone oral or extended-release, disulfiram, or acamprosate). The number of patients receiving any AUD pharmacotherapy for each monthly rolling cohort was based on the total number of patients with medication coverage (fill days) that month. Using a similar approach to prior work in substance use disorders(29), AUD treatment visit modality was defined using VHA clinic stop codes and CPT codes corresponding to video, telephone, or in-person modalities associated with a provider who delivered psychotherapy and/or wrote the prescription for AUD pharmacotherapy (see Supplemental Table). As AUD treatment use may vary based on whether patients had more recently started AUD treatment or not, similar to studies of substance use (13), we divided patients with AUD treatment into two groups: 1) those initiating AUD care, defined as patients with no AUD treatment (including AUD psychotherapy or pharmacotherapy fills covering any days) in the prior 90 days and 2) those continuing AUD care, defined as patients who received any AUD treatment in the prior 90 days.

We compared patient characteristics across patient cohorts of those who received any AUD treatment in the 12 months pre-COVID and COVID periods, which includes overlap of patients who may have received AUD treatment in both periods (see analysis below). We collected available data on sociodemographics including age, sex, race, ethnicity, VHA eligibility status (across categories of service connectedness)(30, 31), rurality of patient residence based on Rural-

Urban Commuting Area codes(32, 33), homelessness and/or housing instability based on ICD-10-CM/visit codes (see Supplemental Table). We also examined clinical characteristics including comorbid mental health disorders (serious mental illness, non-AUD substance use disorders, depression, and post-traumatic stress disorder [PTSD]) along with the number of AUD treatment visits (see Supplemental Table). Rurality and service connectedness, defined by the first documented status during the study period, were included as both may have impacted AUD treatment utilization and modalities used during COVID-19. Mental health diagnoses and homelessness were classified as service used or diagnosis during any visit within the one year prior to the first AUD diagnosis during each study period.

### **Analysis**

The analytic goals were to: 1) estimate the impact of COVID-19 on the percentage of patients with AUD receiving AUD treatment, 2) compare monthly trends in treatment modalities (video, telephone, and in-person) separately for psychotherapy visits and for pharmacotherapy visits between the pre-COVID-19 and COVID-19 periods, and 3) compare characteristics of patients receiving AUD treatment, number of treatment visits, and the number of patients initiating and continuing treatment between the pre-COVID-19 and COVID-19 periods. We calculated in each month among those with diagnosed AUD the percentage (and number) of patients receiving any AUD treatment, and separately for psychotherapy and for pharmacotherapy treatment. We

chose the month of the declaration of the COVID-19 pandemic as a national emergency in the United States (March 2020) as the interruption time point. This declaration was associated with federal telehealth policy changes in the United States that ensued the same month of March 2020 to help address disruptions in healthcare related to the pandemic(34). When the data for overall AUD treatment are visualized over time, the pattern was clearly linear with an interruption, and thus we used a segmented regression model for our interrupted time series (ITS) data analyses(35) for each overall, psychotherapy, and pharmacotherapy. We used the ITSA package in Stata 17(36) (StataCorp. 2021. *Stata Statistical Software: Release 17*. College Station, TX: StataCorp LLC.) which uses robust standard errors. A segmented regression model adjusts for the prior trends in outcome and thus more robustly examines change in AUD treatment trends between the pre- and COVID-19 periods (35, 37). For each time-series outcome data, we included in the model time as month from the start of COVID-19 (incrementing each month by 1 from -12 for March 2019 and 11 for February 2021), an indicator for post-COVID-19 period, and an interaction between time and post-COVID-19 period indicator, allowing estimation of monthly rate of use in AUD treatment during pre-COVID-19 period (slope), immediate level change, and difference in slopes between the two periods, respectively. We also estimated the monthly number of AUD psychotherapy and pharmacotherapy visits by modalities (video, telephone, and in-person) to compare trends in treatment modalities between the two study periods. Finally, patients who received treatment for AUD in the pre-COVID-19 and COVID-19 periods were

compared on patient characteristics and number of AUD treatment visits for both psychotherapy and pharmacotherapy, using generalized linear models with an indicator for the pandemic period and generalized estimating equation (GEE) to account for correlation of patients included in both periods. We used effect sizes to express and understand the standardized magnitude of differences in patient characteristics between cohorts(38, 39). The data for AUD treatment visits was skewed and therefore the median with interquartile range are reported.

In this study, less than 2% of patients had missing data for the following variables: race/ethnicity, rurality, service connectedness. Missing data was grouped into "other/unknown". There was no missing data for other variables. Bias in this study was minimized because the comparisons were based on natural interruption of the COVID-19 pandemic and because we examined monthly time-series data adjusting for trends prior to COVID-19 pandemic across the study outcomes. The analysis plan for this study was not pre-registered and therefore findings are exploratory in nature.

## **RESULTS**

The total number of patients with an AUD diagnosis decreased by 5% from 364,355 in March 2019 to 346,121 in February 2021. ITS analysis in the 12-month pre-COVID period found the

predicted percentage of patients with an AUD diagnosis who were receiving any AUD treatment at the beginning of the study period was 13.8%, and decreased 0.09% per month ( $p=0.005$ , **Table 1** and **Figure 1**). The predicted percentage decreased by 4.3% ( $P=0.001$ ) immediately at the start of the COVID-19 period, followed by an increase of 0.30% per month ( $P=0.026$ ). The predicted percentage of patients receiving any AUD treatment at the end of the study period remained below the pre-COVID-19 period (**Figure 1A**).

From the ITS analysis examining the impact of COVID-19 on AUD treatment, the predicted percentage of patients receiving AUD psychotherapy at the start of the 12-month pre-COVID-19 period was 13.4% with a decrease of 0.1% per month ( $p=0.002$ ) during pre-COVID-19. The predicted percentage of patients receiving AUD psychotherapy treatment decreased by 4.8% ( $P<0.001$ ) immediately at the start of the COVID-19 period, followed by a monthly increase of 0.3% ( $P=0.040$ ). The predicted percentage of patients receiving AUD psychotherapy in the COVID-19 period remained below that in the pre-COVID-19 (**Figure 1B**). The predicted percentage of patients receiving AUD pharmacotherapy at the start of the 12-month pre-COVID-19 period was 2.7% without a significant monthly change ( $p=0.424$ ) during the 12 months prior to the start of COVID-19 and no significant immediate change was seen at start of the COVID-19 period ( $p=0.428$ ). However, the predicted percentage of patients receiving AUD pharmacotherapy treatment increased by 0.04% per month ( $P<0.001$ ) during the COVID-19 period. The predicted

percentage of patients receiving AUD pharmacotherapy at the end of COVID-19 period was significantly higher compared to that at the start of pre-COVID-19 period (**Figure 1C**).

Modalities used for AUD treatment changed substantially during the study period (**Figure 2**). In March 2019, 179,583 visits (97.2% of March 2019 AUD psychotherapy visit) were conducted in-person, and this decreased to 43,251 (36.6%) by February 2021 (**Figure 2a**). Similarly, the number of AUD pharmacotherapy visits that were in-person decreased from 6,363 visits (89.5% of AUD pharmacotherapy visits) in March 2019 to 3,193 visits (34.3% of AUD pharmacotherapy visits) in February 2021 (**Figure 2b**). By February 2021, AUD psychotherapy visits were primarily delivered by video (50%, 58,748), followed by in-person (36.6%, 43,251) and telephone (13.8%, 16,299), while AUD pharmacotherapy visits were delivered by telephone (38.9%, 3,623) closely followed by in-person (34.3%, 3,193) and video (26.8%, 2,498) modalities.

Descriptive comparisons of patient characteristics with an AUD diagnosis and AUD treatment utilization among Veterans engaged in psychotherapy or medication for AUD in the one-year pre-COVID-19 and COVID-19 periods are presented in **Table 2**. Patient characteristics were largely unchanged across the time periods given the small effect sizes, though patients with AUD treatment in the COVID-19 period were more likely to be younger, female, White, and Hispanic and less likely to be homeless or non-service connected compared to patients in pre-COVID-19

period. Patients with AUD treatment in the COVID-19 period had lower prevalence of mental health disorders except for post-traumatic stress disorder (PTSD). The median number of AUD psychotherapy visits per patient decreased significantly in the COVID-19 period ( $p < 0.001$ ), while the median number of AUD pharmacotherapy visits per patient was unchanged ( $p = 0.083$ ) when compared to the pre-COVID-19 period. The number of unique patients who initiated AUD treatment decreased by 30% from 117,653 (117,534 psychotherapy and 24,495 pharmacotherapy) during the pre-COVID-19 period to 82,298 (78,618 psychotherapy and 21,609 pharmacotherapy) in the COVID-19 period. The total number of patients who continued AUD treatment decreased by 12% from 64,951 (60,444 psychotherapy and 12,338 pharmacotherapy) in the pre-COVID-19 period to 57,135 (51,404 psychotherapy and 13,342 pharmacotherapy) in the COVID-19 period.

## **DISCUSSION**

In this study estimating the impact of COVID-19 on AUD treatment in VHA, a nationwide healthcare system in the United States, we found that the percentage of patients with an AUD diagnosis receiving any AUD treatment decreased substantially after the start of COVID-19. Overall decreases in AUD treatment were driven by a sharp decline in psychotherapy treatment visits which were not supplanted by smaller increases in AUD pharmacotherapy visits. At the same time, delivery of AUD care shifted substantially away from in-person visits towards both

video and telephone visits for both psychotherapy and pharmacotherapy. Furthermore, while patient characteristics in the pre-COVID-19 and COVID-19 periods were largely unchanged, the number of patients initiating and continuing AUD treatment also fell. Despite increases in telehealth utilization for AUD treatment, the number of patients receiving AUD treatment declined during COVID-19, suggesting a widening gap in AUD care.

Additionally, the overall number of patients with an AUD diagnosis decreased by 5% over the study period. Given the rise of alcohol associated mortality during COVID-19(3, 4), these findings are concerning and could suggest less Veterans are being diagnosed with AUD during the COVID-19 pandemic despite broader increases in harmful drinking(5, 6, 8). Findings from this study highlight the need to focus on bringing more Veterans with AUD into care, a longstanding problem(40, 41) now exacerbated by COVID-19, and to further consider how AUD care can be optimally delivered using telehealth or in-person modalities to reach more patients.

COVID-19 telehealth policies aimed to support and maintain access to care during the pandemic. These AUD treatment findings differ from prior studies examining opioid use disorder treatment, which found that the expansion of telehealth-delivered buprenorphine helped sustain and even increase opioid use disorder care after the start of the COVID-19 pandemic (13, 14). The sharp rise of alcohol-related mortality during COVID-19 coupled with the rapid implementation and



expansion of telehealth services in response to the pandemic has created urgency to understand what overall needs to be done to both telehealth and in-person care to address AUD treatment needs. In this study, we examined AUD treatment trends across in-person and telehealth (video and telephone) visit modalities in the one year before and one year after onset of COVID-19. Due to social distancing and other COVID-19 mitigation measures, we expectedly saw a sharp decline of in-person AUD treatment visits. Despite an increase in the number of AUD psychotherapy and pharmacotherapy visits delivered by telehealth, the percentage of patients with an AUD diagnosis receiving any AUD treatment along with the median number of psychotherapy visits per patient all decreased in the COVID-19 period when compared to the pre-COVID-19 period.

There are both effective psychosocial and pharmacological treatments for AUD (42-44). However, globally, pre-COVID-19, estimates indicate only one in six people with AUD received treatment(45, 46). Psychotherapy visits can be conducted as individual or group and are aimed at developing skills to manage AUD symptoms. In our study, group and individual psychotherapy accounted for most of the AUD treatment during the pre-COVID-19 period but also decreased the most during the COVID-19 period. One reason for the change in AUD psychotherapy use compared to pharmacotherapy could be the nature of the treatment itself. Many studies suggest that telehealth psychotherapy is associated with similar acceptability and feasibility compared to in-person psychotherapy treatment(20, 47, 48). However, there are some indicators that there

may be additional logistical challenges for group psychotherapy(49, 50) that may impact patient engagement compared to telehealth for individual psychotherapy and pharmacotherapy, at least with rapid implementation that occurred during the pandemic. The lack of supplanted AUD pharmacotherapy in the COVID-19 period may be related to low utilization pre-COVID-19 (23, 40, 51) but may also represent an opportunity to enhance AUD treatment use given the ongoing pandemic and its impact on healthcare. Numerous barriers to AUD treatment exist including stigma, lack of patient-perceived treatment need, limited knowledge regarding AUD treatment by patients and clinicians, limited perceived effectiveness of AUD treatment, among others(52, 53) and the decrease in treatment rates indicate many barriers were further exacerbated by the pandemic.

Examining telehealth delivery of treatment for vulnerable patients, including those with AUD, is particularly important in the current context of the ongoing COVID-19 pandemic. Much of chronic care management, including behavioral health has shifted from in-person to telehealth care during COVID-19(12) and our study findings parallel broader changes reported during COVID-19 (54). However, the observed decline in the percentage of patients receiving AUD treatment, particularly psychotherapy treatment, in this study suggests that AUD treatment needs are not being met despite increases in telehealth utilization. Possible contributors to the declining percentage of patients receiving AUD treatment include: 1) patients dropping out of AUD care,

and 2) a decrease in patients initiating treatment. Both issues are individually problematic, particularly when the overall treatment rates for AUD are low. Prior studies of patient perceptions of telehealth for substance use disorder care have been limited to single practice settings and singular treatments but have demonstrated high levels of patient satisfaction with telehealth treatment, comparable with in-person treatment(19, 20, 55). However, these studies do not distinguish whether patients might have different perceptions of their experiences in telehealth based on the type of substance use disorder treatment received. A small, single-clinic study examined patient satisfaction in telehealth across substance use disorder treatments (including individual and group psychotherapy) during COVID-19 (49). In this study, most patients were continuing (not initiating) substance use disorder treatment, identified alcohol as the substance use that had caused most difficulty lately, and were engaged in group or individual psychotherapy. Despite strong ratings of satisfaction with telehealth, only 36% of participants reported a preference for individual therapy via telehealth and 43% preferred group therapy visits via telehealth. For patients seeking treatment for a range of substance use disorders, there may be varying experiences/preferences for visit modality across evidence-based treatments due to variability in the level of interpersonal interaction and engagement across these visit modalities and further tailoring may be needed to patient preferences that may not have been possible during the pandemic.

There are several strengths and limitations to this study. This study was a retrospective observational cohort study using administrative data, and therefore, findings should be treated as observations. Furthermore, given the lack of pre-registration of the analysis plan, the findings in this study are exploratory. Patients receiving care in VHA are represented in this cohort and are an important population at higher risk for AUD(56), but generalizability to other populations may be limited. The VHA has a comprehensive electronic medical record that includes inpatient and outpatient clinical care and prescription data tracked across all VHA facilities, though our data does not capture treatment received outside of the VHA. During the COVID-19 pandemic, the VHA rapidly implemented infrastructure to support and scale telehealth care delivery broadly so use of telehealth for AUD may exceed that in other health systems(57-61). Additionally, many patients have been previously exposed to AUD treatment but do not remain treated. This study was not able to assess AUD treatment exposure rate, but rather evaluated AUD treatment received at a given point in time. At baseline, before COVID-19, overall receipt of pharmacotherapy for AUD is low across all medications(62). Given the low rates of AUD treatment pre-COVID-19, treatment rates are sensitive to fewer patients coming into care and staying in care.

This study found that in the national VHA healthcare system, the percentage of patients with an AUD diagnosis receiving treatment declined during the COVID-19 pandemic. There have been important priorities set supporting and expanding care for substance use disorders such as opioid use disorder before and during COVID-19. Studies assessing the impact of these policy changes during COVID-19 demonstrate sustainment of opioid use disorder care(14). In contrast, there has been limited investigation of the impact of COVID-19 on AUD treatment utilization. Given the already very low rates of AUD treatment pre-COVID-19 pandemic(45, 46), these decreases are concerning and suggest additional interventions are needed to engage untreated patients with AUD care. This study suggests increased stressors on the healthcare system from COVID-19(11, 63, 64), similar to other medical conditions(65-69), resulted in decreased healthcare utilization, and that transition to telehealth as it was done during the pandemic did not address declines in AUD treatment. It is too soon to tell if the decreases in AUD treatment observed in this study will endure beyond the COVID-19 pandemic, and re-engaging patients into AUD care may prove more challenging. Further studies examining barriers to telehealth (both telephone and video) are needed, especially focusing on psychotherapy for AUD. This study highlights important gaps in AUD treatment in patients in VHA and may be helpful for future program planning and research aimed at increasing engagement in AUD care and treatment.

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**Figure Legend**

**Figure 1.** Trends in the percentage of patients receiving alcohol use disorder (AUD) treatment from March 2019 through February 2021 in Veterans Health Administration. Trend lines are from interrupted time series models: (a) AUD psychotherapy and/or pharmacotherapy use, (b) AUD psychotherapy use, and (c) AUD pharmacotherapy use.

**Figure 2.** Trends in the monthly number of (a) AUD psychotherapy and (b) pharmacotherapy visits across modalities from March 2019 through February 2021 in Veterans Health Administration.

**Table 1.** Interrupted time series analyses examining percentage of patients receiving AUD treatment before (March 2019-February 2020) and during (March 2020-February 2021) COVID-19.

	Pre-COVID-19		<i>Change from February 2020 to March 2020</i>		Post-COVID-19		Post- compared to pre-COVID-19	
	Rate (%) <sup>1</sup>	CI	Change	CI	Rate (%) <sup>1</sup>	CI	Rate Difference	CI
% of patients with any AUD treatment	-0.093 <sup>¶</sup>	(-0.15, -0.03)	-4.270 <sup>¶</sup>	(-6.43, -2.11)	0.298 <sup>^</sup>	(0.04,0.56)	0.391 <sup>¶</sup>	(0.12, 0.66)
% of patients with AUD psychotherapy	-0.101 <sup>¶</sup>	(-0.16, -0.04)	-4.756 <sup>¶</sup>	(-7.11, -2.40)	0.300 <sup>^</sup>	(0.02,0.59)	0.401 <sup>¶</sup>	(0.11, 0.69)
% of patients with AUD pharmacotherapy	-0.004	(-0.01, 0.01)	-0.046	(-0.16, 0.07)	0.041 <sup>¶</sup>	(0.03,0.05)	0.045 <sup>¶</sup>	(0.03,0.06)

CI = confidence interval; AUD = alcohol use disorder

<sup>^</sup> p<0.05, <sup>¶</sup> p<0.01

<sup>1</sup> Change per month in the percentage of patients receiving AUD treatment

**Table 2.** Comparing patient characteristics and treatment utilization among Veterans engaged in psychotherapy or medication for alcohol use disorder during 12 months before (3/2019-2/2020) and after (3/2020-2/2021) COVID-19 telehealth policy changes.

	<b>Pre-COVID-19 N=182,604</b>	<b>COVID-19 N=139,433</b>	<b>p-value<sup>a</sup></b>	<b> ES <sup>c</sup></b>
Age in years	52.3 ± 14.1	51.2 ± 14.1	<0.001	0.065
Age groups [n (%)]			<0.001	0.039
18-29	8559 (4.7)	6416 (4.6)		
30-44	50962 (27.9)	43569 (31.3)		
45-64	82374 (45.1)	61375 (44.0)		
65+	40708 (22.3)	28072 (20.1)		
Female [n (%)]	14880 (8.2)	13187 (9.5)	<0.001	0.046
Race/Ethnicity [n (%)]			<0.001	0.020
White, non-Hispanic	105960 (59.0)	80940 (59.2)		
Black, non-Hispanic	47335 (26.4)	34143 (24.9)		
Hispanic	15973 (8.9)	13090 (9.6)		
Other/Unknown, non-Hispanic	10377 (5.8)	8505 (6.2)		
Rurality [n (%)]			0.431	0.002
Urban	158247 (86.7)	120929 (86.7)		
Rural	18724 (10.3)	14266 (10.2)		
Other/Unknown	5633 (3.1)	4238 (3.0)		
Homelessness	46046 (25.2)	33696 (24.2)	<0.001	0.023
Service Connectedness [n (%)]			<0.001	0.028
Non-Service Connected	60321 (33.0)	45645 (32.7)		
Service Connection <50%	35690 (19.6)	27474 (19.7)		
Service Connection 50% to 100%	85397 (46.8)	64648 (46.4)		
Other/Unknown	1196 (0.7)	1666 (1.2)		
Mental Health Disorders [n (%)]				
Serious mental illness <sup>b</sup>	30869 (16.9)	22267 (15.9)	<0.001	0.027
Other substance use disorder (excluding AUD)	35349 (19.4)	24711 (17.7)	<0.001	0.044
Depressive disorder	115378 (63.2)	87793 (63.0)	0.068	0.004
Post-traumatic stress disorder	89088 (48.8)	68888 (49.4)	<0.001	0.012
Number of AUD psychotherapy visits, <i>Median (IQR)</i>	3 (1, 10)	3 (1, 8)	<0.001	0.117
Number of AUD pharmacotherapy visits, <i>Median (IQR)</i>	2 (1, 4)	2 (1, 5)	0.083	0.039

AUD = alcohol use disorder; IQR = interquartile range; SD = standard deviation; ES is standardized effect size.

Cell values are mean ± standard deviation unless otherwise specified.

<sup>a</sup> p values comes from generalized estimating equation (GEE) with an indicator for the COVID period to account for correlation of patients included in both periods.

<sup>b</sup> Includes bipolar disorder, psychosis, and/or schizophrenia

<sup>c</sup> Effect size calculation:

1. For continuous variable:

$$D = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{s_1^2 + s_2^2}{2}}}$$
 $\bar{x}_1$  and  $\bar{x}_2$  denote the sample mean of variable in each group,  $s_1^2$  and  $s_2^2$  denote the sample variances, respectively.

2. For binary variable:

$$D = \frac{\hat{p}_1 - \hat{p}_2}{\sqrt{\frac{\hat{p}_1(1-\hat{p}_1) + \hat{p}_2(1-\hat{p}_2)}{2}}}$$
 $\hat{p}_1$  and  $\hat{p}_2$  denote the proportion of variable respectively

3. For categorical variable with more than 2 groups, the effect size comes from Cramér's V for chi-square test.

Figure 2.

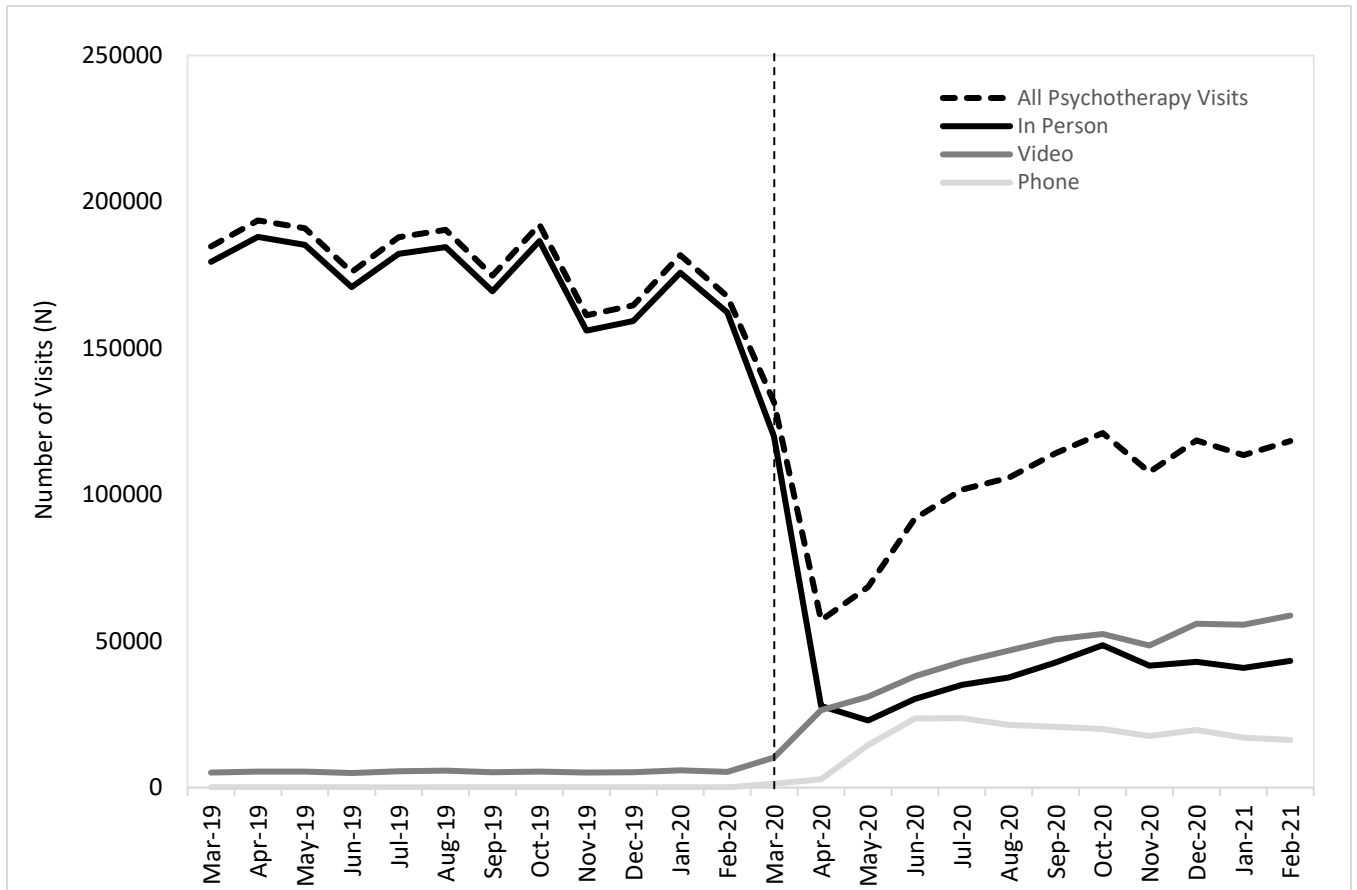
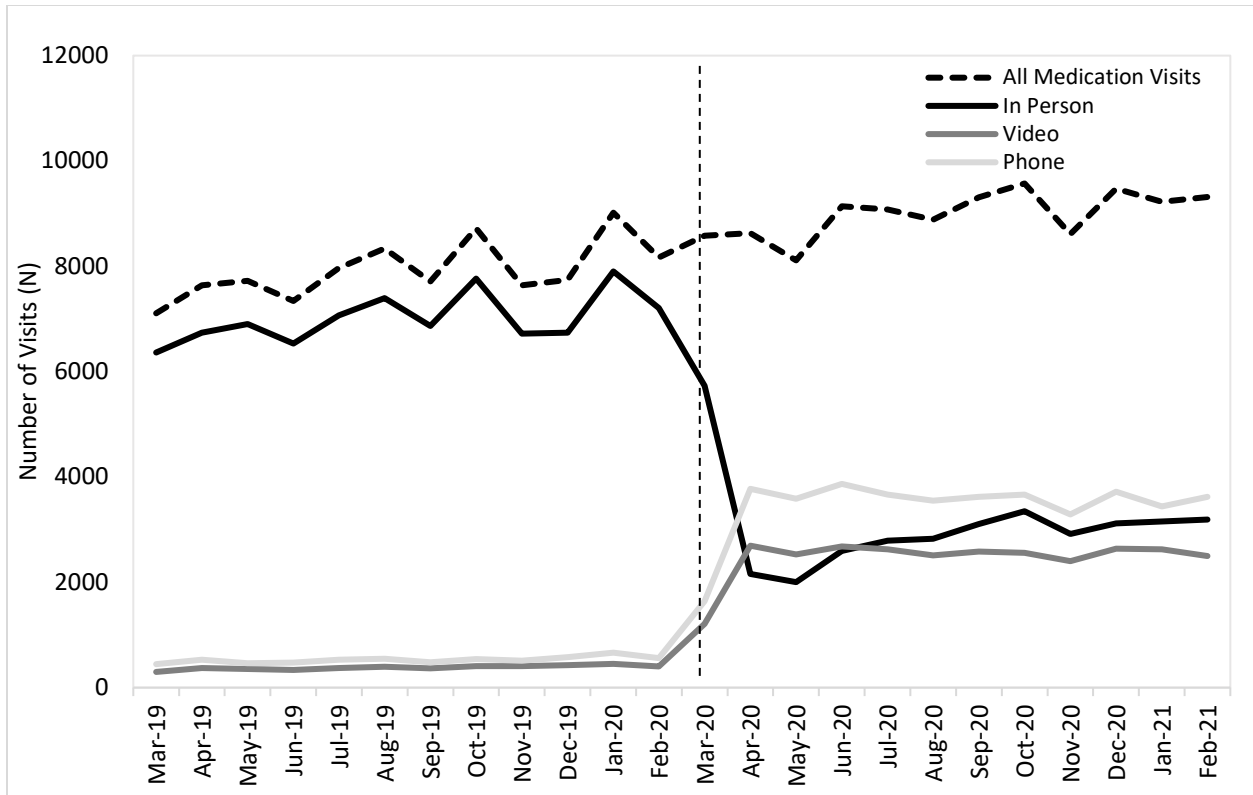


Figure 2a. Number of AUD psychotherapy visits in the Veterans Health Administration across modalities on a given month between 3/2019 and 2/2021.

Note: the dashed line denotes the point between pre- and post-COVID timepoints (3/1/2020).



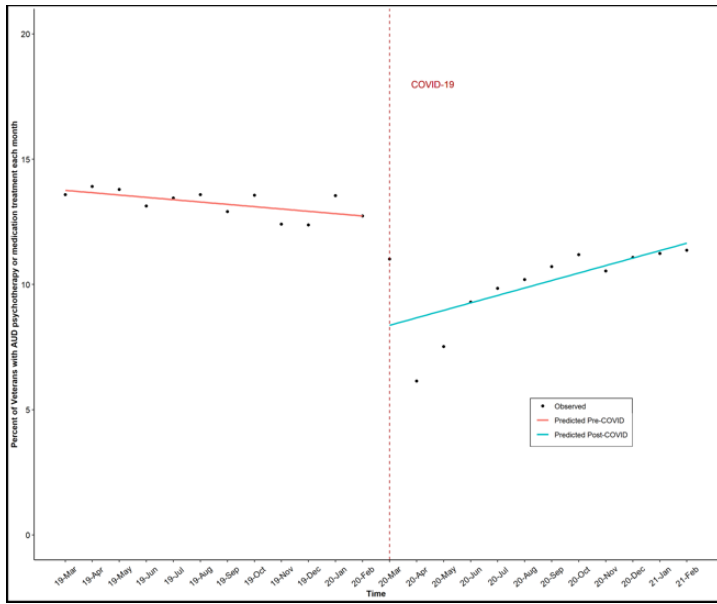


**Figure 2b.** Number of AUD visits with a receipt of pharmacotherapy in the Veterans Health Administration across modalities on a given month between 3/2019 and 2/2021.

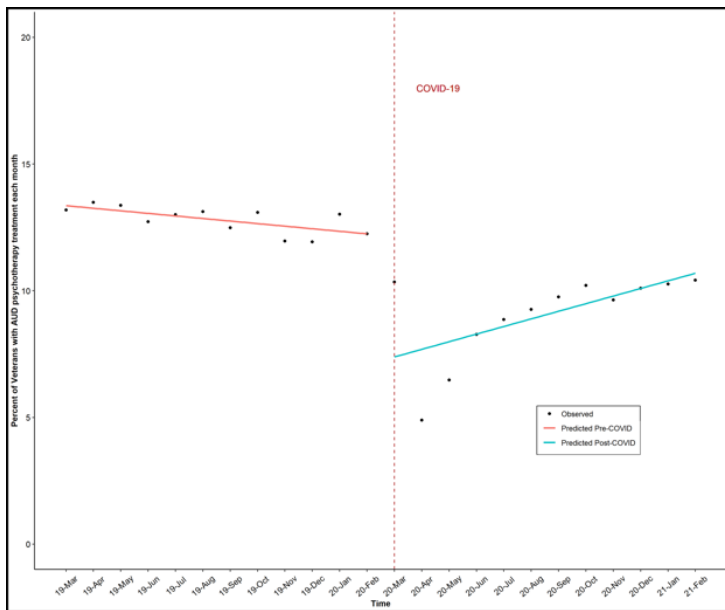
Note: the dashed line denotes the point between pre- and post-COVID timepoints (3/1/2020).

Figure 1.

A. Percentage of patients receiving any AUD treatment



B. Percentage of patients receiving AUD psychotherapy treatment



C. Percentage of patients receiving AUD psychotherapy treatment

