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# A cohort study examining changes in treatment patterns for alcohol use disorder among commercially insured adults in the United States during the COVID-19 pandemic

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## ABSTRACT

**Introduction:** We know very little about how the pandemic impacted outpatient alcohol use disorder (AUD) care and the role of telemedicine.

**Methods:** Using OptumLabs® Data Warehouse de-identified administrative claims, we identified AUD cohorts in 2018 ( $N = 23,204$ ) and 2019 ( $N = 23,445$ ) and examined outpatient visits the following year, focusing on week 12, corresponding to the March 2020 US COVID-19 emergency declaration, through week 52. Using multivariable logistic regression, we examined the association between patient demographic and clinical characteristics and receipt of any outpatient AUD visits in 2020 vs. 2019.

**Results:** In 2020, weekly AUD visit utilization decreased maximally at the pandemic start (week 12) by 22.5 % (2019: 3.8 %, 2020: 3.0 %, percentage point change [95 % CI] =  $-0.86[-1.19, -0.05]$ ) but was similar to 2019 utilization by mid-April 2020 (week 16). Telemedicine accounted for 50.1 % of AUD visits by early July 2020 (week 27). Individual therapy returned to 2019 levels within 1 week (i.e., week 13) whereas group therapy did not consistently do so until mid-August 2020 (week 31). Further, individual therapy exceeded 2019 levels by as much as 50 % starting mid-October 2020. The study found no substantial differences in visits by patient demographic or clinical characteristics.

**Conclusions:** Among patients with known AUD, initial outpatient care disruptions were relatively brief. However, substantial shifts occurred in care delivery—an embrace of telemedicine but also more pronounced, longer disruptions in group therapy vs. individual and an increase in individual therapy use. Further research needs to help us understand the implications of these findings for clinical outcomes.

## 1. Introduction

Alcohol use disorder (AUD), the most prevalent substance use disorder in the United States, occurs in 11.0 % of the adult US population (Substance Abuse and Mental Health Services Administration, 2021) and is associated with significant illness, disability, and mortality (Abdul-Rahman et al., 2018; Amiri & Behnezhad, 2020; DiMaggio et al., 2021; Roerecke & Rehm, 2014; Spencer et al., 2020). AUD is a chronic

condition for which ongoing outpatient monitoring and care are recommended, including stabilization and recovery after acute exacerbations (McLellan et al., 2000; “U.S. Department of Health and Human Services (HHS), Office of the Surgeon General, Facing Addiction in America: The Surgeon General’s Report on Alcohol, Drugs, and Health. Washington, DC: HHS, November 2016”).

Systematic reviews and meta-analyses find that alcohol use increased in the United States during the pandemic (Acuff et al., 2021; Schmidt

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et al., 2021). A consistent finding is that problematic drinking prior to the pandemic (defined a variety of different ways across studies) has been associated with increased alcohol use during the pandemic (Acuff et al., 2021; Schmidt et al., 2021). The elevated risk of increased alcohol use during the pandemic, particularly among those with more severe alcohol use pre-pandemic, occurred during a time of disruptions in outpatient health care utilization and greater reliance on telemedicine particularly in behavioral health care (Mehrotra et al., 2021; Yang et al., 2020). However, we know little about changes in outpatient AUD care specifically during the pandemic.

Additionally, several patient populations exist that prior literature would suggest might be more vulnerable to experiencing decreased access to or disruptions in AUD care. For example, prior research finds that compared to men, women with AUD are less likely to access treatment (Alvanzo et al., 2014; Greenfield et al., 2007; Mellinger et al., 2019) and more likely to report stigma as a barrier to accessing care (Khan et al., 2013). Compared to those in urban areas, those in rural areas have less access to SUD care (Borders & Booth, 2007), have a narrower range of AUD providers and services available (Edmond et al., 2015), and are less likely to access AUD care in general (Borders & Booth, 2007) and AUD medication specifically (Huskamp, Reif, et al., 2020). Further, there are some patient characteristics that suggest more clinical severity and/or complexity among patients with AUD—such as co-occurring mental health conditions, co-occurring substance use disorders, AUD severity noted by prior emergency department/hospitalization for AUD, or alcohol related medical comorbidities that are a direct result of AUD (e.g., alcohol liver disease or pancreatitis). Knowing whether these conditions or complexities were associated with changes in outpatient AUD care during the pandemic is important.

In this study, we examine outpatient treatment utilization for AUD in 2020 compared to the same interval in 2019. We also examine whether differences occurred for specific AUD treatment modalities (e.g., individual vs. group therapy, medications), and the role of telemedicine in outpatient AUD care during the pandemic. We hypothesized that disruptions in AUD care associated with the pandemic would vary by outpatient treatment service type (e.g., any visit type, individual therapy, group therapy) and that certain patient populations would be more vulnerable to experiencing disruptions in care during the pandemic (e.g., women compared to men, individuals living in rural versus non-rural areas, individuals with more severe AUD or who are more complicated in terms of mental health and medical comorbidities).

## 2. Materials and methods

The Harvard Medical School institutional review board approved this population-based cohort study, and the study followed the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines for cohort studies (von Elm et al., 2007).

### 2.1. Study cohort

We used de-identified administrative claims data from the Optum-Labs® Data Warehouse. These data are nation-wide and include enrollee health care utilization data for services billed to the healthplan for payment purposes (e.g., visit or procedure codes, diagnoses associated with the visits, prescription fills) as well as some demographic data (age, sex, rurality). The administrative data include utilization information on care that occurs broadly in health care: in primary care or specialty care, including from specialty addiction care providers.

From these data we developed two cohorts of individuals with AUD (ICD-10 code F10.xx). The study used one cohort of individuals identified in the claims as having AUD in 2018 (i.e., “2018 cohort”) to examine outpatient AUD treatment utilization in 2019. We used the second cohort, individuals who were identified as having AUD in 2019 (i.e., “2019 cohort”), to examine AUD treatment utilization in 2020. To be included in an AUD cohort, an enrollee was required to be between age

18 and 64 and have continuous enrollment in medical, behavioral health, and pharmacy benefits for 2 years—the cohort defining year and the subsequent treatment utilization year (see Appendix Fig. 1). These criteria above were selected to reduce study bias by defining a cohort of individuals derived from complete enrollment in each of the claims data files (medical, behavioral, pharmacy) required for determining cohort eligibility and subsequent health care utilization in the following data year. An individual was identified as having AUD if any one of the following occurred in the cohort defining year: 1) at least one hospitalization where AUD was the primary diagnosis, 2) at least one emergency department visit where AUD was in the first or second diagnostic field, or 3) at least two face-to-face visits (e.g., non-laboratory or imaging) on separate days in either outpatient, intensive outpatient, partial hospital, or residential care with a diagnosis of AUD in the primary or secondary diagnosis field (see Appendix Table 1). For individuals who met the above criteria in 2018, we examined their AUD outpatient utilization from January 1, 2019, to December 31, 2019; and for those who met the criteria in 2019, we examined their AUD outpatient utilization January 1, 2020, to December 31, 2020.

### 2.2. Outcomes

Our primary outcome was use of any AUD outpatient visits (in a given week or longer time periods as described below). We similarly also examined use of the following: 1) any AUD outpatient therapy visit (group or individual); 2) any AUD outpatient individual therapy visit; 3) any AUD group therapy visit; and 4) an AUD medication (MAUD) fill. Finally, we determined the percent of outpatient AUD visits conducted via telemedicine each week.

#### 2.2.1. Outpatient care definitions

An outpatient AUD visit was defined as an outpatient visit where an AUD diagnosis was in the primary or secondary diagnostic field of the claim and defined by outpatient visit types (any outpatient, any therapy [group, individual or family], individual therapy, group therapy) using Current Procedural Terminology (CPT) and Healthcare Common Procedure Coding System (HCPCS) codes (Appendix Table 1). The study defined any outpatient visit type as initial assessments, evaluation and management visits, or therapy [individual, group, family] visits. The definition of MAUD outcome was a claim for any one of the following guideline-recommended medications for AUD: acamprosate, naltrexone, disulfiram, or topiramate (Department of Veterans Affairs, 2021; Kranzler & Soyka, 2018; Reus et al., 2018). A medication claim could be either a prescription fill, or in the case of intramuscular naltrexone, a facility administered medication administration (HCPCS code J2315).

#### 2.2.2. Telemedicine use definitions

The study defined telemedicine visits (audio only or video and audio interactive) as outpatient visits that met any of the following criteria: Place of Service code = 02, or modifier GT, GQ, G0 or 95, or HCPCS codes: 99441-99443, 98966-98968, G2025.

### 2.3. Patient characteristics

The demographic characteristics included age group (18–24, 25–34, 35–44, 45–54, 55–64), documented sex (female, male), US census region (Northeast, Midwest, South, West), and rural versus non-rural area of residence, consistent with Medicare's definition (Medicare Learning Network Fact Sheet: Telehealth Services, 2021). We also defined the following dichotomous clinical characteristics in the cohort-defining year (i.e., prior to the utilization year of interest): whether a patient had an alcohol related medical condition, defined as a co-occurring medical condition identified by the Centers for Disease Control and Prevention as having a 100 % attributable fraction to alcohol (Centers for Disease Control and Prevention) (Appendix Table 2), an outpatient visit for a mental health condition (ICD-10: F20-F69, F80-F99),

moderate/severe (versus mild) AUD (ICD-10: 10.2 vs. 10.1), co-occurring other substance use disorder (SUD) (ICD-10: F11-F16, F18-F19), and an emergency department (ED) visit or hospitalization for AUD.

#### 2.4. Statistical analysis

In unadjusted analyses, we compared 2019 vs. 2020 weekly utilization of outpatient visits (i.e., at least one AUD visit [any therapy, individual therapy, group therapy]) and MAUD fills/claims, calculating the weekly percentage point change in receiving a visit and the 95 % confidence interval of the percentage point change. Additionally, we examined the fraction of AUD outpatient visits each week in 2020 (in general and by therapy type) that were conducted via telemedicine.

To further understand whether differences existed between 2019 and 2020 utilization in our key measures since the start of the pandemic, we conducted bivariate analyses that aggregated the calendar weeks in 2020 into two time periods: an “early pandemic” (weeks 12–22) and a “later pandemic” period (weeks 23–52), and compared them with the same calendar weeks in 2019. The early pandemic period (weeks 12–22) corresponds to mid-March through the end of May 2020 and represents the earliest period of the pandemic in the United States, when health care providers and systems were adjusting to workflow changes due to COVID-19. The study team selected week 12 as the start of the early pandemic period because the COVID-19 federal declaration of national emergency began near the end of week 11, on March 13, 2020 (“[Declaring a National Emergency Concerning the Novel Coronavirus Disease \(COVID-19\) Outbreak, 2020, Executive Office of the President, 85 Federal Register 15337 \(March 13, 2020\)](#)”). The later pandemic period (weeks 23–52) corresponds to the weeks starting May 31, 2020, two months after the federal pandemic declaration. The research team conducted bivariate analyses for each of our outpatient utilization outcomes (visits, medications), their percentage point differences in 2019 vs. 2020, and the 95 % confidence interval of the differences in percentage points.

Finally, in multivariable logistic regression models we examined whether patient characteristics (demographic or clinical) were associated with the outcome “any AUD outpatient visit” within three calendar timeframes: pre-pandemic (weeks 1–11), early pandemic, and later pandemic. In each regression model, we interacted the utilization year (2019 vs. 2020) with key patient characteristics of interest (documented sex, rural residence, and the prior year clinical characteristics: having an alcohol related medical condition, mental health visit, moderate/severe AUD, co-occurring non-AUD SUD, or ED visit or inpatient stay for AUD). Due to the overlap of patients between the two cohorts (12.9 %), we clustered the standard errors by patient. A small number of patients within each cohort had missing information for US region ( $N = 12$  in 2018 cohort and  $N < 11$  in 2019 cohort); in the logistic regression analysis we added these to the control group (Northeast region).

### 3. Results

#### 3.1. Study cohort characteristics

The 2018 AUD cohort ( $N = 23,204$ ) and 2019 cohort ( $N = 23,445$ ) were similar in terms of demographic and clinical characteristics (Table 1). Approximately a third were female (e.g., 2018 cohort: 35.8 %) and very few lived in a rural area (2018 cohort: 2.1 %). Approximately half (2018 cohort: 53.8 %) had a diagnosis of moderate or severe AUD; a small fraction had a co-occurring alcohol-related medical condition (2018 cohort: 5.1 %). In the cohort defining year, approximately half had an outpatient visit for a co-occurring mental health condition (2018 cohort: 50.7 %), and approximately half (2018 cohort: 53.1 %) had an emergency department visit or inpatient hospitalization for AUD.

**Table 1**

Demographic and clinical characteristics of individuals in the 2018 and 2019 AUD study cohorts.

		2018 Cohort $N = 23,204$		2019 Cohort $N = 23,445$	
		N	%	N	%
<b>Demographic characteristics</b>					
Age	18–24	3333	14.4	2924	12.5
	25–34	3226	13.9	3307	14.1
	35–44	4283	18.5	4539	19.4
	45–54	5338	23.0	5389	23.0
	55–64	7024	30.3	7286	31.1
Female		8306	35.8	8362	35.7
Rural		496	2.1	542	2.3
Region	Northeast	3661	15.8	3634	15.5
	Midwest	7122	30.7	7087	30.2
	South	8532	36.8	8777	37.4
	West	3877	16.7	>3936	16.8
	Unknown	12	0.1	*	
<b>Clinical characteristics<sup>a</sup></b>					
Alcohol related medical condition		1175	5.1	1232	5.3
Co-occurring (non-AUD) substance use disorder		5599	24.1	5794	24.7
Mental health visit		11,753	50.7	12,216	52.1
Moderate/severe AUD		12,483	53.8	12,930	55.2
Prior year AUD emergency department visit or inpatient admission		12,318	53.1	12,268	52.3

<sup>a</sup> All clinical characteristics defined in prior (i.e., cohort defining) year.

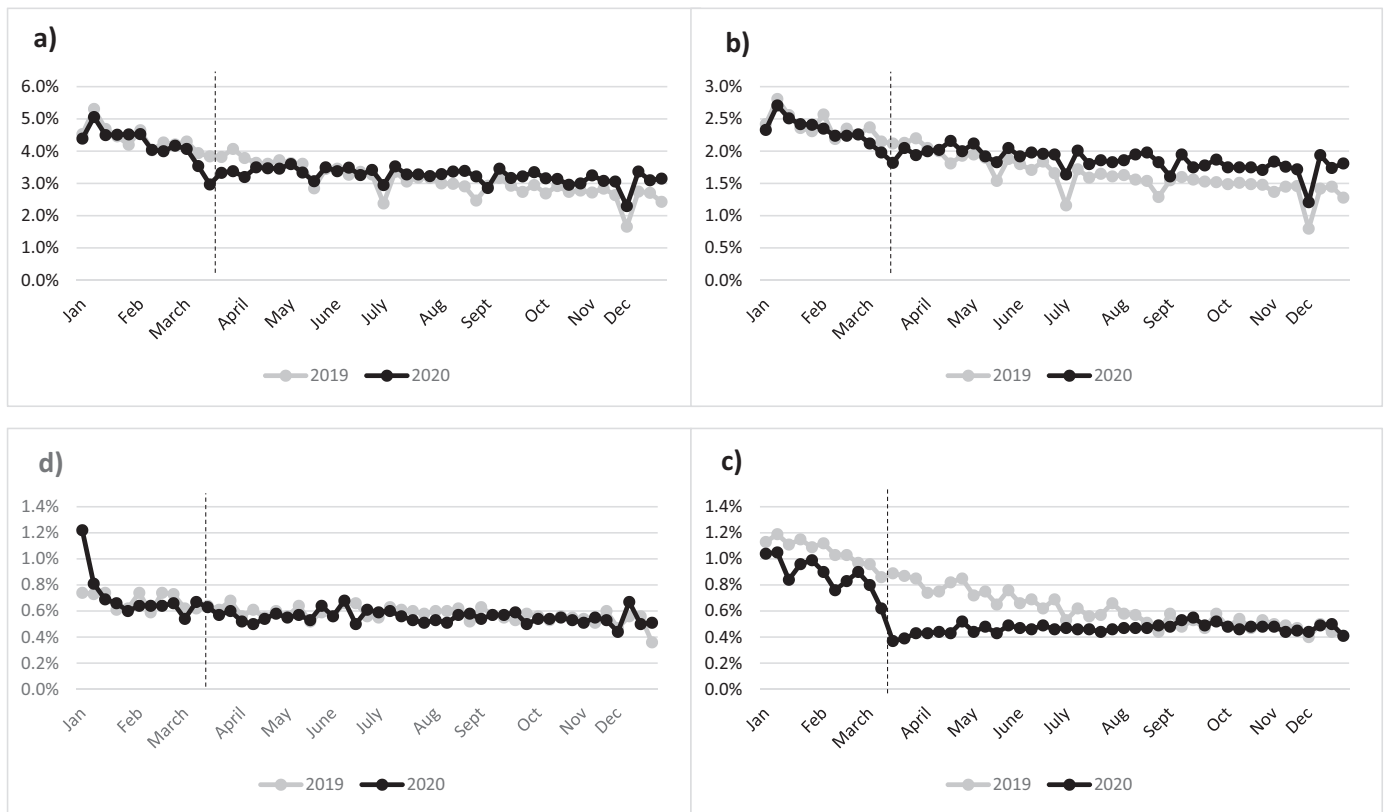
\*  $N < 11$ .

#### 3.2. Weekly AUD outpatient visits and medication use

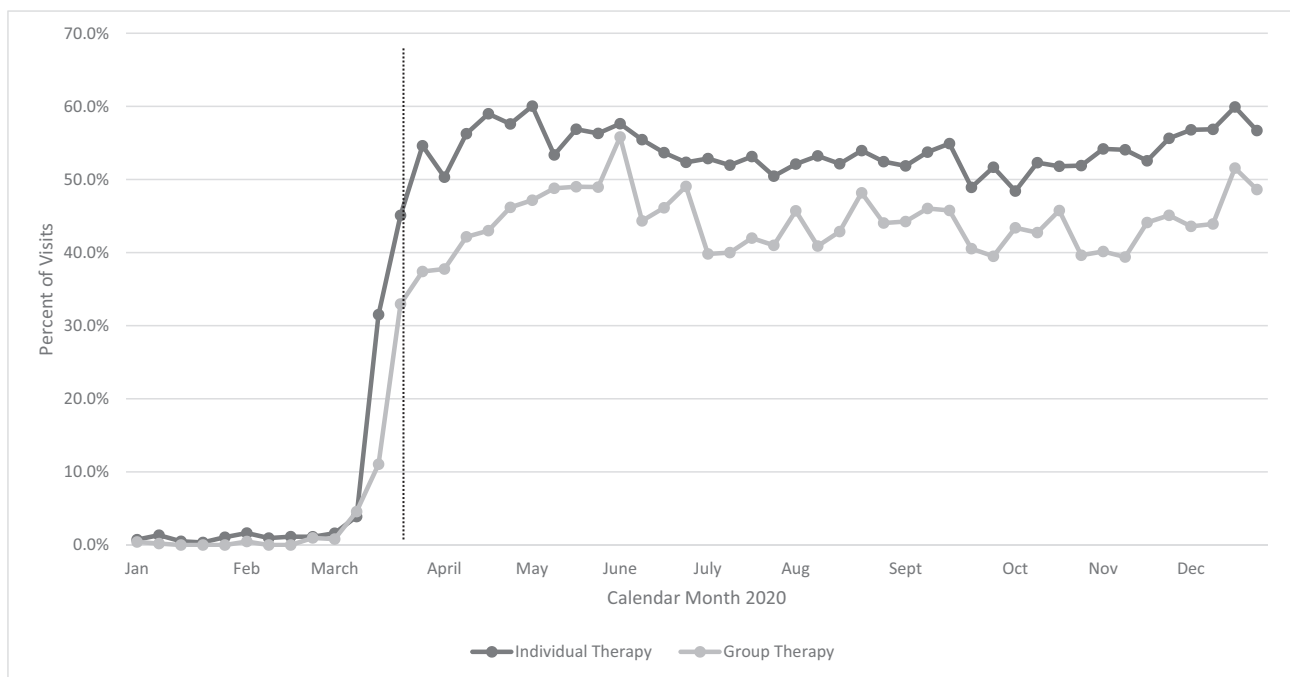
In the pre-pandemic weeks of 2020, the percentage of individuals who received an AUD visit was similar to 2019 levels (Fig. 1a, Appendix Table 3A). In the first weeks of the pandemic, mid-March through mid-April (weeks 12–15 of 2020), fewer individuals with AUD received an outpatient visit relative to the same weeks in 2019 (nadir in week 12: 3.8 % in 2019 vs. 3.0 % in 2020, 0.9 percentage points lower [95 % CI =  $-1.19, -0.53$ ], corresponding to a 22.5 % reduction), followed by an eventual increase relative to 2019 by early August 2020 (week 33: 3.0 % in 2019 vs. 3.4 % in 2020, 0.4 percentage points higher [0.06, 0.70] or 12.7 % increase). Outpatient therapy (any type) also initially decreased similarly and then rebounded, but the patterns were very different for individual therapy compared to group therapy (Fig. 1b–c, Appendix Table 3B–C). For example, the start of the pandemic in 2020 (week 12), saw a 14.1 % decrease in the percent who received any individual therapy (2.1 % in 2019 vs. 1.8 % in 2020, a 0.3 percentage point decrease [ $-0.55, -0.05$ ]), whereas for group therapy it was 58.4 % (0.9 % in 2019 vs. 0.4 % in 2020, a 0.5 percentage point decrease [ $-0.7, -0.4$ ]). Additionally, weekly individual therapy use in 2020 began to exceed 2019 levels intermittently by late April 2020 (week 17), and consistently by late September (week 39) (e.g., week 39: 1.5 % in 2019 vs. 1.8 % in 2020, a 0.3 percentage point increase [0.02, 0.5], corresponding to a 16.5 % increase), whereas group therapy in 2020 did not exceed 2019 use and remained below 2019 as late as the last week in July 2020 (week 31) (0.7 % in 2019 vs. 0.5 % in 2020, 0.2 percentage points lower [ $-0.3, -0.1$ ], corresponding to a 30.4 % decrease). MAUD use remained similar in 2020 relative to 2019 (Fig. 1d, Appendix Table 3D).

#### 3.3. Telemedicine use

Prior to the COVID federal emergency declaration (weeks 1–10 in 2020),  $\leq 2.2$  % of AUD outpatient visits were conducted via telemedicine. The first full week following the federal emergency declaration (week 12), 30.0 % of the AUD outpatient visits were conducted via telemedicine. Telemedicine use peaked in the 1st week of May 2020



**Fig. 1.** Percent of patients in the 2018 and 2019 AUD cohorts who had weekly outpatient care: a) AUD visit (any type), b) individual therapy visit, c) group therapy visit, and d) AUD medication supply in 2019 and 2020. Note: Y-axes vary among Fig. 1a–d. Calendar weeks 1–51 included in graph; week 52 had uneven number of days in 2019 vs 2020 and therefore is not included in graphs. US federal emergency declaration due to pandemic began March 11, 2020 and is denoted by vertical dotted line in graphs.



**Fig. 2.** Weekly percent of outpatient AUD therapy visits in 2020, by type (individual or group therapy), that were conducted via telemedicine among commercially insured population with AUD (2019 cohort). Note: Calendar weeks 1–51 included in graph; week 52 had uneven number of days in 2019 vs 2020 and therefore is not included in graphs. US federal emergency declaration due to pandemic began March 11, 2020 and is denoted by vertical dotted line in graph.



(week 19), composing 59.8 % of the AUD visits (Appendix Table 4). Throughout the rest of 2020 between 46.0 % and 55.6 % of AUD visits each week were conducted using telemedicine. Telemedicine was used less frequently for group therapy than for individual therapy (Fig. 2, Appendix Table 4). For example, following early July 2020 (week 23), the weekly percent of individual therapy visits conducted via telemedicine ranged from 48.4 % to 59.9 % and for group therapy ranged from 39.4 % to 51.6 %.

### 3.4. Use of any AUD outpatient visits or medication during the early and later pandemic periods

During the early pandemic period, fewer patients with AUD received at least one visit relative to 2019 (2019: 14.4 %, 2020: 13.1 %, 1.24 percentage points lower [−1.86, −0.62], corresponding to an 8.6 % decrease), with group therapy being the most disrupted (2019: 1.8 %, 2020: 1.0 %, 0.80 percentage points lower [−1.01, −0.58], corresponding to a 43.7 % decrease) (Table 2). During the later pandemic period, only the use of any group therapy was lower in 2020 relative to 2019 (2019: 2.2 %, 2020: 1.7 %, 0.52 percentage points lower [−0.77, −0.27], representing a 23.7 % decrease). The study found no differences in MAUD claims (i.e., a fill or facility administered medication) between 2020 and 2019 in either the early or later pandemic period in 2020.

### 3.5. Logistic regression results: odds of any AUD outpatient visits, 2019 vs. 2020

We found little change (no main effect of 2020 compared to 2019) in the odds of having at least one AUD outpatient visit during the early or later pandemic (Table 3, Appendix Table 5). Additionally, we found little differential association between the demographic (documented sex, rurality) and clinical characteristics of interest and receiving an outpatient visit for AUD during the early or later pandemic periods,

**Table 2**

Changes in alcohol use disorder visits mid-March through December (calendar weeks 12–22 and 23–52), 2019 vs 2020<sup>a</sup>.

	Utilization year		2019 Change from 2020		Percent change relative to 2019
	2019 (%)	2020 (%)	Point estimate	95 % CI	
<b>Weeks 12–22</b>					
Outpatient visit	<b>14.36</b>	<b>13.12</b>	<b>−1.24</b>	<b>−1.86, −0.62</b>	<b>−8.63</b>
Therapy visit	<b>7.69</b>	<b>6.61</b>	<b>−1.08</b>	<b>−1.54, −0.61</b>	<b>−14.01</b>
Individual therapy	<b>6.83</b>	<b>6.18</b>	<b>−0.65</b>	<b>−1.09, −0.20</b>	<b>−9.46</b>
Group therapy	<b>1.82</b>	<b>1.02</b>	<b>−0.80</b>	<b>−1.01, −0.58</b>	<b>−43.71</b>
On AUD medications	3.96	3.78	−0.18	−0.53, 0.17	−4.47
<b>Weeks 23–52</b>					
Outpatient visit	19.85	20.58	0.73	0.001, 1.46	3.68
Therapy visit	9.07	9.21	0.14	−0.38, 0.66	1.54
Individual therapy	8.21	8.60	0.39	−0.11, 0.89	4.75
Group therapy	<b>2.19</b>	<b>1.67</b>	<b>−0.52</b>	<b>−0.77, −0.27</b>	<b>−23.74</b>
On AUD medications	6.07	6.01	−0.06	−0.49, 0.37	−0.99

Note: All estimates in table rounded to two decimal places; percent change relative to 2019 reported based on data calculations that included all (i.e., beyond 2) decimal places. Bold font highlights outcomes where the 95 % CI of the odds ratio is less than or greater than 1.

<sup>a</sup> At least one visit for AUD in given time period. Unadjusted analyses.

relative to the same weeks in 2019. The exception was that during the early pandemic period, the most disrupted time of treatment, men had differentially lower odds of receiving an outpatient AUD visit compared to women (OR [95 % CI]: 0.89 [0.80, 0.99]).

## 4. Discussion

Patients previously identified with AUD experienced a sudden drop in AUD outpatient visits at the start of the pandemic, but within a month outpatient AUD visit rates returned to pre-pandemic levels and we saw no change in MAUD use. These findings are consistent with studies focused on opioid use disorder, which also found brief disruptions in care (Mellis et al., 2021) and that medication use did not decrease during the pandemic (Busch et al., 2022; Clement et al., 2021; Huskamp, Busch, et al., 2020). Telemedicine accounted for roughly half of AUD visits provided during the pandemic—consistent with other recent research documenting the important role that telemedicine played in other SUD treatment during this period (Huskamp, Busch, et al., 2020; Lin et al., 2021; Yang et al., 2020).

While the total amount of AUD care was similar in 2020, the delivery model substantially changed. Group therapy visits were disproportionately disrupted early in the pandemic and then rebounded to 2019 levels, while individual therapy use was higher than 2019 levels in the second half of 2020. Possibly the increase in individual therapy represents an attempt by clinicians to “substitute” more individual sessions for group sessions, increase contact with patients who may be relapsing or more at risk for relapse during the pandemic, or both. Alternatively, it may represent the result of other factors such as differences in patient satisfaction with these modalities that were increasingly delivered via telemedicine. The large disruption of group therapy is concerning given that it can provide important recovery support and skill building unavailable in individual therapy, such as reducing feelings of isolation; providing peer support, community, and encouragement for recovery (Substance Abuse and Mental Health Services Administration, 2005). Additionally, group therapy, during which one or two clinicians can treat 8–12 patients in an hour of care, can be an efficient way to deliver AUD care compared to individual therapy. To the extent that individual therapy was substituting for group therapy, this could further strain capacity for AUD care in the system during the pandemic and is an important public health concern.

A larger proportion of group therapy visits, relative to individual therapy, was conducted via telemedicine. Pre-pandemic literature describes that group telemedicine for SUDs is feasible and can be acceptable to patients (Gentry et al., 2019; Lin et al., 2019; Marjot et al., 2021), but may be associated with lower rates of therapeutic alliance compared to in-person groups (Gentry et al., 2019). Consistent with this, more recent research conducted earlier in the pandemic describes that therapists more commonly perceive that group therapy conducted via telemedicine is more challenging to deliver than are individual therapy (Landes et al., 2021; Sugarman, Busch, et al., 2021), and that some patients are less-satisfied with it as well (Sugarman, Horvitz, et al., 2021). Some recent reports describe additional technology challenges unique to virtual group therapy, and a learning process on the part of clinicians regarding adaptations to the therapy process when conducting virtual versus in-person group therapy (Kneeland et al., 2021; Vinci et al., 2022). As a result of the additional challenges, possibly fewer providers offered tele-group therapy, and/or patients experienced more difficulty participating or engaging in these sessions.

Contrary to our expectations, we did not find that those with comorbidities (mental health, other substance use disorder, or alcohol related medical conditions) or individuals in rural areas had a greater disruption in AUD visits during the pandemic. Some of these patient characteristics (such as AUD severity and co-occurring mental health conditions) have been associated with alcohol use and severity during the pandemic (Schmidt et al., 2021). Notably, our patient cohorts were individuals identified as using an AUD service in the prior year

**Table 3**

Odds of receiving an AUD outpatient visit in designated calendar-week period, 2019 vs 2020.

	Calendar weeks 1–11		Calendar weeks 12–22		Calendar weeks 23–52	
	OR	95 % CI	OR	95 % CI	OR	95 % CI
Year 2020	1.00	0.85–1.16	0.89	0.75–1.06	1.03	0.89–1.18
Interaction terms						
Year 2020 * male	1.01	0.92–1.12	<b>0.89</b>	<b>0.80–0.99</b>	0.99	0.90–1.08
Year 2020 * rural	0.85	0.60–1.21	1.03	0.72–1.49	0.80	0.59–1.10
Year 2020 * alcohol related medical condition	0.99	0.84–1.18	0.99	0.83–1.18	0.98	0.84–1.14
Year 2020 * moderate/severe AUD	0.91	0.82–1.02	0.93	0.82–1.05	0.95	0.86–1.05
Year 2020 * co-occurring (non-AUD) SUD	1.18	1.06–1.33	1.11	0.98–1.25	1.06	0.95–1.17
Year 2020 * prior ED visit or hospitalization for MH/SUD	0.93	0.84–1.03	0.93	0.83–1.04	0.95	0.87–1.05
Year 2020 * mental health condition	1.10	0.96–1.25	1.13	0.98–1.31	1.05	0.93–1.18

ED = emergency department; SUD = substance use disorder; AUD = alcohol use disorder; MH = mental health visit.

Models also adjusted for main effects of: age group, US region, documented sex, rural (vs not), presence of alcohol related medical condition, moderate/severe AUD (vs. mild), co-occurring other SUD, prior co-occurring mental health visit, prior MH/SUD ED visit or hospital admission.

AUD severity, co-occurring SUD, prior visit for co-occurring mental health, prior MH/SUD ED visit or hospitalization, alcohol related medical condition—all established using prior year (i.e., prior to utilization year) claims.

Calendar weeks 1–11 = pre-pandemic in 2020, weeks 12–22 = early pandemic period in 2020, weeks 23–52 = later pandemic period in 2020. Bold font highlights outcomes where the 95 % CI of the odds ratio is less than or greater than 1.

(inpatient, ED, outpatient) and thus they are a population with some prior engagement in AUD care. It is perhaps not surprising that we did not observe a decrease in outpatient utilization associated with the pandemic in this population of patients who were previously engaged in AUD care, given the rapid expansion and widespread use of telemedicine soon after the pandemic's start. However, we did find that men, relative to women, had fewer AUD visits in the early weeks of the pandemic relative to the same weeks the year before. This finding is difficult to interpret in the context of recent literature, which finds inconsistent results regarding gender-based differences in alcohol use during the pandemic (Schmidt et al., 2021).

Our study has several limitations. It is limited to individuals who were commercially insured; our results may not be generalizable to individuals with AUD enrolled in Medicare or Medicaid, or those enrolled in commercial plans not represented in these data. Since our cohorts comprised individuals identified as having AUD the prior year, our findings may not generalize to those with new AUD during the pandemic, or those whose AUD predates the pandemic but who had not previously engaged in AUD care. Additionally, because our study necessitated continuous enrollment in medical, behavioral health and pharmacy plans for 2 years (the cohort identifying year and the utilization outcome year), our results may not be generalizable to all patients with AUD; for example those who lose insurance due to changing employers or becoming unemployed. We were unable to examine whether differences existed in receiving a visit associated with socio-economic status (SES), race or ethnicity during the pandemic in 2020 because SES and race/ethnicity data are unavailable in commercial claims. Enrollees in geographically rural areas were under-represented in our study (~2 %). We do not have information on the types of clinics where these patients were seen. Further, we are unable to observe clinical symptoms in claims data. Therefore, we are unable to determine whether patients received an adequate amount or type of care for their AUD. Finally, our outpatient outcomes describe changes in having "at least one" visit or prescription fill/claim in a given time period. Particularly for the larger observation windows (i.e., the early and later pandemic periods as opposed to the weekly observations), these outcomes are not able to distinguish if there were changes in the frequency of care within these time windows.

## 5. Conclusions

In this national study of a commercially insured population, we found initial disruptions in the use of outpatient AUD visits early in the pandemic, but this disruption lasted only about a month. This finding is all the more notable given that our study cohort comprised those with

baseline AUD and therefore a group at higher risk of increasing alcohol use during the pandemic. Group therapy visits were disproportionately disrupted—both in magnitude and duration of disruption—relative to individual therapy. While telemedicine was a large contributor to maintaining access for AUD care in 2020 during the pandemic, patients and providers likely perceived it to be a better substitute for in-person individual therapy than in-person group therapy. Additional research needs to further delineate the effect of the pandemic on AUD care—in particular, we need research that explores the clinical implications of these findings, and whether the appropriate role of telemedicine for group therapy may be more limited (or limited for certain patients) relative to its potential role for other types of AUD visits.

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The funding source had no involvement in the study design; collection, analysis, interpretation of data; in the writing of the report; and in the decision to submit the article for publication.

## CRediT authorship contribution statement

ABB, HAH, AM, and SR conceptualized the study and developed the research methods. ABB drafted the first version of the manuscript; all authors (ABB, HAH, AM, SR, LUP, SFG) contributed to the interpretation of the study findings and the manuscript writing. All authors approved the final version of this manuscript for submission.

## Conflict of interest

No conflict declared.

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## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jsat.2022.108920>.

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