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Inequitable access to general and behavioral healthcare in the US during the COVID-19 pandemic: A role for telehealth?

Nina Mulia [a,*], Yu Ye [a], Thomas K. Greenfield [a], Priscilla Martinez [a], Deidre Patterson [a], William C. Kerr [a], Katherine J. Karriker-Jaffe [b]

[a] Alcohol Research Group, 6001 Shellmound St., Suite 450, Emeryville, CA 94608, USA
[b] RTI International, 2150 Shattuck Ave., Suite 800, Berkeley, CA 94704, USA

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ABSTRACT

Wide-ranging effects of the COVID-19 pandemic have led to increased psychological distress and alcohol consumption, and disproportionate hardship for disadvantaged groups. Early in the pandemic, telehealth services were expanded to maintain healthcare access amidst lockdowns, medical office closures, and fear of infection. This study examines general and behavioral healthcare access and disparities during the first year of the pandemic. Data are from the 2019–2020 US National Alcohol Survey (collected February 2019 to April 2020) and its COVID follow-up survey conducted January 30 to March 28, 2021 ($N = 1819$). General and behavioral healthcare-related outcomes were assessed at follow-up, and included perceived need for and receipt of care, delayed care, and use of telehealth since April 1, 2020. Results indicate that the majority of respondents with perceived need for healthcare received some behavioral healthcare (reported by 63%) and particularly general healthcare (88%), but nearly half (48%) delayed needed care. Delays were mostly due to COVID-related reasons, but cost barriers also were common and significantly impeded care-seeking by uninsured persons, young adults, rural residents, and persons whose employment was reduced by the pandemic. Disparities in the receipt of healthcare were pronounced for Hispanic/Latinx (vs. White) and lower-income (vs. higher-income) groups (AORs <0.37, p's < 0.05). Notably, telehealth was commonly used by Hispanic/Latinx and lower-income groups for general and particularly behavioral healthcare. Results suggest that telehealth has provided an important bridge to healthcare for certain medically underserved groups during the pandemic, and may be vital to future efforts to increase equity in healthcare access.

1. Introduction

The COVID-19 pandemic engendered profound social, economic and health impacts that led to increased psychological distress and alcohol consumption.(Kerr et al., 2022; Kessler et al., 2021; Martinez et al., 2022; Marroquín et al., 2020; Schmidt et al., 2021) While wide-ranging consequences have affected all, the worst US impacts have been concentrated in communities of color that were disadvantaged prior to the pandemic.(Bassett et al., 2020; Couch et al., 2020; Gonzalez et al., 2020; Kantamneni, 2020; Lopez III et al., 2021; Bertoldo et al., 2022) Similar to studies linking positive health outcomes with safety net programs during the Great Recession,(Stuckler et al., 2009) new research finds that economic interventions during COVID-19 helped to mitigate financial hardships and psychological stress.(Saloner et al., 2022; Donnelly and Farina, 2021; Hamad and Galea, 2022; Raifman et al., 2021)

The US healthcare sector's rapid scaling up of telehealth(Connolly et al., 2021; Joshi and Lewiss, 2020; Patel et al., 2021; Cantor et al., 2021) was another crucial, COVID-19 response. Although telehealth has long existed, it garnered limited interest from US patients, providers and payers(Bashshur et al., 2020; Clapp et al., 2020) until pandemic lockdowns, medical office closures, and widespread fear of infection made telehealth an essential tool for healthcare delivery.(Bashshur et al., 2020) The US government's declaration of a Public Health Emergency (PHE) facilitated telehealth uptake by relaxing regulations and increasing reimbursable telehealth services, modalities (e.g., telephone) and settings.(Anthony, 2020; Bose et al., 2022; U.S. Centers for Medicare and Medicaid Services, 2020; California Department of Health Care Services, 2021) But telehealth's rapid growth has raised cost and fraud concerns.(Bashshur et al., 2020) Thus, the future of telehealth expansion after the PHE remains uncertain.(Bose et al., 2022; U.S. Centers for

* Corresponding author at: Alcohol Research Group, Public Health Institute, 6001 Shellmound St., Suite 450, Emeryville, CA 94608, USA.
E-mail address: nmulia@arg.org (N. Mulia).

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Medicare and Medicaid Services, 2020; California Department of Health Care Services, 2021)

Two questions could help inform decision-making about telehealth's future. The first concerns healthcare access during COVID-19 – specifically, whether certain population subgroups were more or less likely to receive or delay needed healthcare and for what reasons. Studies show an overall decline in healthcare use during COVID-19 driven by large reductions in in-person services,(Connolly et al., 2021; Samson et al., 2021) with pronounced declines in primary care visits by White and especially Asian American patients.(Morgan et al., 2022)

The second question concerns who benefitted from telehealth expansion, and whether expansion might reduce or exacerbate inequities in healthcare access.(Patel et al., 2021; Cantor et al., 2021; Bose et al., 2022; Samson et al., 2021) Before COVID-19, there were indications of telehealth disparities.(Gordon and Hornbrook, 2016) Outside the US, telehealth in less-resourced contexts has been hampered by inadequate infrastructure, insurance coverage, and broadband connectivity(Anthony, 2020) – similar to reports for some segments of the US population(Gordon and Hornbrook, 2016; Kontos et al., 2014; Park et al., 2018) – and during COVID-19, gender and socioeconomic (SES) disparities in telehealth use were found.(Smolić et al., 2022) In the US, early-COVID data indicate telehealth use was greater in metropolitan counties,(Patel et al., 2021; Cantor et al., 2021) mixed in lower-SES areas,(Patel et al., 2021; Cantor et al., 2021; Bose et al., 2022) and lower among Black patients.(Samson et al., 2021)

Many US studies capturing COVID-19 telehealth expansion focus on employer- and Medicare-insured persons. Complementing such research, general population studies can describe groups underrepresented in insurance claims data. The current study helps to address this gap. Using survey data from an existing, national sample, we assessed receipt of needed healthcare, telehealth use, and disparities during the first year of the pandemic. We expected to find disparities in healthcare access. Although lockdowns and fear might have a leveling effect, we expected that the pandemic's severe financial consequences for lower-income and minoritized groups, together with the US digital divide,(Gordon and Hornbrook, 2016; Vogels, 2021) would perpetuate inequities in access to healthcare, including telehealth.

2. Methods

2.1. Data

This study uses the 14th edition of the cross-sectional U.S. National Alcohol Survey (NAS) series (N14) and its COVID-19 follow-up survey (N14C). The NASs are population-representative surveys of non-institutionalized adults ages 18+ .(Kerr et al., 2018) N14 data were collected from February 2019 to April 2020 using probability samples of random-digit dialed (RDD) landline and cell phone numbers and an address-based sample (ABS), supplemented with a nonprobability web panel sample. Interviews were conducted in English or Spanish via telephone (RDD sample) or web questionnaires (ABS and panel samples). Black/African American and Hispanic/Latinx people were oversampled. N14 included 9668 respondents, with 8493 complete interviews (1326 RDD; 5184 ABS; 1983 panel). The American Association for Public Opinion Research COOP4 cooperation rate(The American Association for Public Opinion Research, 2011) for the combined RDD and ABS samples was 42.2%. Study procedures were approved by the Public Health Institute's IRB.

Participants from the web panel were not eligible for re-contact. Of the 6510 respondents recruited via ABS or RDD, 3146 (2416 from ABS and 730 from RDD) agreed to be re-contacted and were mailed an invitation to complete the N14C online survey in English or Spanish. N14C data were collected from January 30, 2021 through March 28, 2021, with 1819 completed online surveys (58% response rate). More details on N14C can be found elsewhere (see (Kerr et al., 2022)).

2.2. Measures

Perceived need for general and behavioral healthcare during COVID-19. All N14C respondents were asked whether they wanted or needed "healthcare or a health check-up" at any time since April 1, 2020 (affirmative responses indicated perceived need for general healthcare) and, separately, whether they wanted or needed "…mental healthcare or counseling" or "…help for their drinking". Affirmative responses to either indicated perceived need for behavioral healthcare.

Receipt of general and behavioral healthcare during COVID-19. Those who reported perceived need for healthcare were asked whether they had received care from different types of providers since April 1, 2020. Those reporting care from "a healthcare provider" were coded as receiving general healthcare; those reporting care from "a mental health counselor", "a substance use counselor" or "a mutual help group such as Alcoholics Anonymous" were coded as receiving behavioral healthcare.

Reasons for delayed care during COVID-19. Those reporting need for healthcare were also asked: "Since April 1, 2020, have you delayed getting care for your health, mental health, or drinking for any of the following reasons?" Respondents indicated which listed reasons applied, which were subsequently categorized as: 1) COVID-related ("providers weren't seeing anyone in person", "afraid of getting COVID", "following stay-at-home orders") and 2) cost ("couldn't afford it").

Use of telehealth for general and behavioral healthcare. Among those receiving healthcare, for each type of provider (healthcare provider, mental health counselor, alcohol service provider) respondents were asked "was this by electronic messaging or email, phone or videochat", consistent with public insurers' coverage of these telehealth modalities during the PHE (e.g., see(U.S. Centers for Medicare and Medicaid Services, 2020)).

Baseline (T1) socio-demographic and health predictors. Consistent with theoretical models for healthcare utilization, variables capturing dimensions of access(Penchansky and Thomas, 1981) and predisposing and enabling factors(Aday and Andersen, 1974) were used to predict healthcare receipt. These included gender, age, race/ethnicity (White, Black, Hispanic/Latinx, and other self-reported identities), household income as a percentage of the federal poverty level ($\leq$138%, 139–400% and $>$ 400%), marital and parenthood status (married/partnered without child, married/partnered with child, single without child, single with child), urbanicity (rural or urban, defined using Rural-Urban Commuting Areas), and U.S. region (Northeast, Midwest, Pacific, South, Mountain). Baseline health insurance was coded as: 1) private/other (employer-sponsored, self-paid, and federal plan), 2) public (Medicaid, Medicare), or 3) uninsured. Baseline self-rated health was dichotomized as good to excellent or fair/poor.(Manor et al., 2000) Usual source of primary care (yes/no) at baseline was based on respondent self-report of having a "clinic or health center" or "doctor's office or HMO" where they usually go when sick; all other responses (e.g., emergency room) were coded no. COVID-related employment impacts (yes/no) were asked of all respondents, and indicated by self-report of reduced work hours or pay since April 1, 2020.

2.3. Data analysis

Bivariate chi-square analysis examined associations of COVID-19 healthcare-related outcomes (perceived need, received care, reasons for delayed care, use of telehealth) with socio-demographic, health, and COVID-impact predictors. Parallel analyses were conducted for general and behavioral healthcare. Multivariable logistic regression models were estimated for each outcome separately, including gender, age, and race/ethnicity in all models, as well as covariates that were marginally significant ($p < 0.10$) in bivariate analyses.

Sensitivity analyses assessed sparse data bias which can arise with inadequate sample sizes for some combination of outcome levels and predictors, resulting in very large effect estimates that are potentially biased away from the null.(Greenland et al., 2016) Following Greenland

and colleagues,(Greenland et al., 2016) we examined events per variable (EPV, the number of minimum positive and negative outcomes per variable) for each regression model and compared adjusted and unadjusted odds ratios (ORs).

N14C sampling weights were based on N14 weights, which adjusted for probability of selection and racial/ethnic oversampling, with post-stratification adjustment to account for nonresponse and noncoverage. (Martinez et al., 2022) Adjustments were then made for N14C nonresponse using propensity score (PS) methods to sequentially account for nonresponse at two stages (agreeing to be re-contacted and completing the N14C), based on respondent demographic and other characteristics (e.g., gender, age, education, marital status, general health). The PS-weighted N14C sample matched the U.S. population; more details on weighting are available elsewhere (see(Kerr et al., 2022)). All analyses were weighted using Stata survey commands.(StataCorp, 2019)

Table 1
Perceived need for and receipt of general healthcare and behavioral healthcare in the 2021 NAS COVID Follow-up Survey, $N = 1819$.

Demographics	(in overall sample) Perceived need for care		(among those with need)[1] Received care		(among those with need)[2] Delayed caredue to:		(among those receiving care)[3] Used telehealth	
	General / check-up	Behavioral Health[4]	General / check-up	Behavioral Health[5]	Lockdown/office closed/ fear	Cost	General / check-up	Behavioral health
TOTAL	50.7	17.7	88.3	62.8	37.5	12.5	53.8	83.2
Age								
18–34	46.1*	29.5***	84.0**	64.5	40.6	22.0***	53.4	78.0
35–49	48.2	18.2	81.7	59.8	38.6	14.1	60.7	89.7
50+	55.0	9.8	93.7	62.3	35.1	5.8	51.1	85.8
Gender								
Female	53.7ł	19.5	90.5	67.3	37.6	9.9ł	58.7*	86.8
Male	47.5	15.7	85.7	56.9	37.4	15.4	47.9	78.7
Race								
White	53.7**	17.5	91.3***	66.2	38.6	10.9	51.0ł	81.8*
Black/Afr Am	41.9	15.6	91.9	74.4	32.8	11.5	52.5	64.7
Hispanic/Latinx	42.0	17.8	71.1	48.1	35.6	19.2	67.8	97.7
Other groups	56.2	21.7	84.4	48.6	38.2	16.2	60.9	100.0
Insurance type, T1								
Private/other	53.9*	16.8	89.9*	62.8	36.2	10.6***	52.8	82.5
Public	47.5	18.7	88.7	59.6	37.4	9.2	55.1	82.4
Uninsured	40.2	20.8	70.8	73.3	50.5	44.2	58.0	90.0
Household income as % of FPL[6], T1								
≤138% FPL	45.4	29.6***	79.2*	52.8ł	44.4	16.4**	60.2	88.2
139–400% FPL	50.5	16.8	88.1	62.7	36.7	16.1	52.5	78.2
>400% FPL	53.3	12.1	92.5	75.5	35.1	5.6	51.5	86.3
Self-rated health, T1								
Fair/poor	60.2*	25.5*	87.9	62.9	38.8	14.5	68.6**	76.0
Good/excellent	49.2	16.4	88.4	62.8	37.3	12.1	50.8	84.9
Urbanicity, T1								
Urban	50.5	16.7	89.4	63.6	38.5	10.5**	53.8	86.6ł
Rural	52.0	22.3	82.5	61.1	32.8	22.5	53.6	67.4
Work/pay reduced								
Yes	46.3	22.0*	82.8ł	54.5	44.3ł	24.5***	49.1	78.5
No	52.1	16.2	89.8	66.3	35.4	8.8	55.0	84.8
Marital and Parenthood status, T1								
Married/partnered no child	49.3	12.1**	91.6	69.8	38.0	12.1	51.6	75.5
Married/partnered With child	50.4	16.5	88.8	61.3	37.3	8.8	49.7	82.7
Single no child	52.7	22.7	86.6	61.2	37.4	14.1	56.8	88.0
Single with child	49.1	23.5	80.1	55.3	36.3	17.8	62.4	87.4
Usual source of primary care, T1								
Yes	55.1***	16.7	91.2***	63.8	35.6ł	9.9**	55.4	86.9
No	37.1	20.5	75.2	60.3	45.5	23.0	45.9	73.5
Region of residence, T1								
Northeast	46.2	19.1	92.3	59.0	36.8	6.7	62.5**	95.0ł
Midwest	51.9	18.2	89.1	70.0	35.5	11.6	46.5	77.0
Pacific	47.7	17.6	79.2	54.3	45.5	9.2	67.6	96.2
South	52.5	16.9	90.3	65.4	37.1	16.8	46.6	75.3
Mountain	53.4	17.1	85.0	56.7	33.3	11.7	67.2	85.8

ł$p < 0.10$, *$p < 0.05$, **$p < 0.01$, ***p < 0.001, chi-square tests were used to assess bivariate associations between each predictor and outcome separately.
T1, the N14 (baseline) survey.

[1] Receipt of care for general health since April 1, 2020 was examined among those who had perceived need for general healthcare (N = 968); receipt of care for behavioral health since April 1, 2020 was examined among those who had perceived need for behavioral healthcare (N = 347).

[2] Reason for delayed care since April 1, 2020 was examined among those who had perceived need for either general or behavioral healthcare (N = 1057).

[3] Use of telehealth for general health was examined among those who received any general healthcare since April 1, 2020 (N = 919); use of telehealth for behavioral health was examined among those who received any behavioral healthcare since April 1, 2020 (N = 255).

[4] Wanted or needed mental healthcare or counseling, or counseling for drinking.

[5] Received care from a mental health counselor, substance use counselor, or mutual help group such as alcoholics anonymous.

[6] FPL, US federal poverty level.

3. Results

Perceived Need for Healthcare during COVID-19. As seen in Table 1, 51% of the sample wanted or needed general healthcare, and 18% wanted or needed behavioral healthcare. The latter varied by group, with nearly one-third (30%) of people under age 35 and of those in the lowest-income group needing behavioral healthcare. Among those needing behavioral healthcare, virtually all (97%) wanted mental healthcare whereas 5.4% wanted help for their drinking (see Supplemental Table S1 available online for Table 1 cell sizes).

In multivariable models (Table 2A), Black respondents were less likely than White respondents to perceive need for either general or behavioral healthcare (adjusted odds ratios [AOR] = 0.67 and 0.57, respectively; p's < 0.05). Perceived need for general healthcare also was lower among persons with public (vs. private) insurance (AOR = 0.68; $p < 0.05$) and those with no (vs. any) usual source of primary care (AOR = 0.53; $p < 0.001$). Groups more likely to perceive need for general healthcare included those with fair/poor self-rated health (AOR = 1.73, $p < 0.05$) and, for behavioral healthcare, adults under age 50 (AORs > 2.4, p's < 0.001), the lowest-income group (AOR = 2.16, $p < 0.05$), and single persons without children (AOR = 1.60, $p < 0.05$).

Receipt of Needed Healthcare during COVID-19. Receipt of care was examined among those who indicated they perceived need for general healthcare ($N = 968$) and behavioral healthcare ($N = 347$), respectively. A large majority (88%) received needed general healthcare, whereas fewer than two-thirds (63%) received needed behavioral healthcare (Table 1). The Hispanic-White disparity was pronounced, with a 20-percentage point difference in receiving general healthcare and an 18-percentage point difference in behavioral healthcare receipt. In multivariable models (Table 2A), Hispanic/Latinx (vs. White) respondents had one-third the odds of receiving needed general healthcare (AOR = 0.36; $p < 0.05$); while sizeable, the disparity in behavioral healthcare receipt for Hispanic/Latinx respondents was not statistically significant (AOR = 0.49; $p > 0.10$). Disparities in receipt of needed behavioral healthcare also were seen between the lowest- vs. highest-income groups (AOR = 0.34; $p < 0.05$). Persons lacking (vs. having) a usual source of primary care and persons ages 35–49 (vs. 50+) also were less likely to receive needed general healthcare (AORs = 0.39; p's < 0.05).

Delaying Needed Healthcare during COVID-19. Reasons for delayed care were examined in those who perceived need for either general or behavioral healthcare ($N = 1057$). In this subsample, nearly half (48.4%) delayed getting care. More than one-third (38%) delayed healthcare due to COVID-related reasons (Table 1); there were no

Table 2A
Adjusted odds ratios (AORs) and 95% confidence intervals (CIs) in logistic regressions predicting perceived need for and receipt of general and behavioral healthcare in the 2021 NAS COVID Follow-up Survey [1].

	(in overall sample) Perceived need for care				(among those with need)[2] Received care			
	General / check-up		Behavioral health		General / check-up		Behavioral health	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Age								
18–34	0.80	(0.58, 1.10)	3.91***	(2.46, 6.20)	0.59	(0.27, 1.29)	1.22	(0.53, 2.83)
35–49	0.79	(0.56, 1.12)	2.47***	(1.49, 4.07)	0.39*	(0.17, 0.91)	0.93	(0.37, 2.31)
50+	Ref		Ref		Ref		Ref	
Gender								
Female	1.21	(0.93, 1.59)	1.33	(0.92, 1.93)	1.60	(0.88, 2.89)	1.50	(0.75, 3.01)
Male	Ref		Ref		Ref		Ref	
Race								
White	Ref		Ref		Ref		Ref	
Black/Afr Am	0.67*	(0.46, 0.99)	0.57*	(0.34, 0.97)	1.49	(0.64, 3.48)	1.75	(0.67, 4.60)
Hispanic/Latinx	0.69ŧ	(0.45, 1.05)	0.67	(0.40, 1.15)	0.36*	(0.15, 0.82)	0.49	(0.19, 1.27)
Other groups	1.22	(0.78, 1.91)	1.09	(0.58, 2.04)	0.71	(0.30, 1.70)	0.47	(0.15, 1.49)
Insurance type, T1								
Private/other	Ref				Ref			
Public	0.68*	(0.50, 0.93)			0.78	(0.35, 1.73)		
Uninsured	0.77	(0.47, 1.27)			0.67	(0.27, 1.71)		
Household income as % of FPL at T1								
≤138% FPL			2.16**	(1.22, 3.81)	0.41ŧ	(0.16, 1.06)	0.34*	(0.13, 0.89)
139–400% FPL			1.20	(0.80, 1.81)	0.58	(0.29, 1.19)	0.54	(0.23, 1.27)
>400% FPL			Ref		Ref		Ref	
Self-rated health, T1								
Fair/poor	1.73*	(1.10, 2.71)	1.58ŧ	(0.97, 2.57)				
Good/excellent	Ref		Ref					
Work/pay reduced								
Yes			1.14	(0.77, 1.68)	0.84	(0.45, 1.58)		
No			Ref		Ref			
Marital and Parenthood status, T1								
Married/partnered no child			Ref					
Mar/part w/ child			0.78	(0.46, 1.33)				
Single no child			1.60*	(1.02, 2.52)				
Single w/ child			1.08	(0.55, 2.15)				
Usual source of primary care, T1								
Yes	Ref				Ref			
No	0.53***	(0.38, 0.73)			0.39**	(0.20, 0.73)		

ŧ$p < 0.10$, *p < 0.05, **p < 0.01, ***$p < 0.001$.
FPL, US federal poverty level.
T1, the N14 (baseline) survey.
[1] Each outcome corresponds to a logistic regression model that includes gender, age, race/ethnicity and any other predictor that was found to be at least marginally significant (p < 0.10) in Table 1 bivariate analysis; in cases where adjusted ORs are not present for a given variable, the variable was not included in the model (but was used in some other model whose results are presented in this table).
[2] See footnote 1 in Table 1 for analytic sample n's.

significant correlates of delaying care for these reasons. By contrast, healthcare delays due to cost concerns were reported by 13% of respondents overall, and this did vary across groups. Uninsured persons had the highest prevalence of delayed care due to costs (44%), followed by persons experiencing job/pay reductions during COVID-19 (25%), those lacking a usual source of primary care (23%), rural residents (23%), and young adults (22%). In adjusted models, uninsured persons (AOR = 4.58), young adults (AOR = 3.42), and rural residents (AOR = 3.12) were most likely to delay care due to costs, followed by persons reporting reduced work hours/pay (OR = 2.62) (all p's < 0.01; Table 2B).

Use of Telehealth during COVID-19. Telehealth use for general healthcare (TGH) and behavioral healthcare (TBH) was examined among those who received general healthcare ($N = 919$) and behavioral healthcare ($N = 255$), respectively. In these subgroups, telehealth was commonly used for general healthcare (54%) and especially behavioral healthcare (83%) (Table 1). Race and ethnicity were strongly associated with telehealth use. Nearly all Hispanic/Latinx persons (98%) and all persons of "other" race and ethnicity used TBH, compared with 65% of Black and 82% of White respondents. Multivariable models showed Hispanic/Latinx persons had greater odds of using TBH (AOR = 11.96; $p < 0.05$) and marginally greater odds of using TGH (AOR = 1.69; $p <$

Table 2B
Adjusted odds ratios (AORs) and 95% confidence intervals (CIs) in logistic regressions predicting perceived need for and receipt of general and behavioral healthcare in the 2021 NAS COVID Follow-up Survey.[1]

	(among those with need)[2] Delayed care due to:				(among those who received care)[2] Used telehealth			
	Lockdown/office closed/ fear		Cost		General / check-up ($N = 864$)		Behavioral health ($N = 238$)	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Age								
18–34	1.13	(0.73, 1.75)	3.42**	(1.38, 8.50)	0.98	(0.63, 1.53)	0.47	(0.15, 1.53)
35–49	1.09	(0.70, 1.70)	2.16	(0.74, 6.28)	1.46ŧ	(0.94, 2.26)	1.00	(0.26, 3.76)
50+	Ref		Ref		Ref		Ref	
Gender								
Female	1.03	(0.72, 1.48)	0.65	(0.36, 1.17)	1.71**	(1.17, 2.50)	2.10	(0.78, 5.67)
Male	Ref		Ref		Ref		Ref	
Race								
White	Ref		Ref		Ref		Ref	
Black/Afr Am	0.68	(0.40, 1.16)	0.81	(0.33, 1.99)	1.14	(0.64, 2.03)	0.36	(0.11, 1.21)
Hispanic/Latinx	0.80	(0.45, 1.41)	1.22	(0.50, 3.02)	1.69ŧ	(0.92, 3.11)	11.96*, [3]	(1.07, 133.40)
Other groups	0.88	(0.50, 1.58)	1.01	(0.46, 2.19)	1.27	(0.57, 2.81)	NA[4]	
Insurance type, T1								
Private/other			Ref					
Public			1.08	(0.46, 2.54)				
Uninsured			4.58***	(2.06, 10.18)				
Household income as % of FPL at T1								
≤138% FPL			1.40	(0.51, 3.87)				
139–400% FPL			2.20*	(1.02, 4.75)				
>400% FPL			Ref					
Self-rated health, T1								
Fair/poor					2.18*	(1.20, 3.96)		
Good/excellent					Ref			
Urbanicity, T1								
Urban			Ref				Ref	
Rural			3.12**	(1.59, 6.13)			0.30ŧ	(0.09, 1.01)
Work/pay reduced								
Yes	1.40	(0.92, 2.12)	2.62**	(1.40, 4.92)				
No	Ref		Ref					
Usual source of primary care, T1								
Yes	Ref		Ref					
No	1.45	(0.91, 2.30)	1.36	(0.68, 2.74)				
Region of residence, T1								
Northeast					Ref		Ref	
Midwest					0.51*	(0.27, 0.96)	0.21	(0.03, 1.69)
Pacific					1.26	(0.60, 2.65)	1.51	(0.12, 19.59)
South					0.55ŧ	(0.30, 1.01)	0.25	(0.03, 1.91)
Mountain					1.26	(0.51, 3.12)	0.26	(0.02, 3.34)

ŧp < 0.10, *p < 0.05, **p < 0.01, ***p < 0.001.
FPL, US federal poverty level.
T1, the N14 (baseline) survey.

[1] Each outcome corresponds to a logistic regression model that includes gender, age, race/ethnicity and any other predictor that was found to be at least marginally significant (p < 0.10) in Table 1 bivariate analysis; when adjusted ORs are not present for a given variable, it means the variable was not included in the model (but was used in some other model whose results are presented in this table).

[2] See footnote 1 in Table 1 for analytic sample n's.

[3] This high OR for Hispanic/Latinx vs. white respondents (adjusted OR = 11.96) is largely due to very high telehealth use for behavioral health among Hispanic/Latinx respondents (26 out of 27 reported that they received tele-behavioral healthcare). Given the large confidence interval, we conducted analysis of marginal effects comparing the predicted probability of telehealth use for behavioral health, adjusting for covariates. This additional analysis showed the predicted Hispanic-white difference in telehealth use is +15.9% (95% CI: 7.4%, 24.3%); that is, Hispanic/Latinx respondents had a nearly 16 percentage point greater predicted prevalence of tele-behavioral healthcare receipt relative to white respondents. Results available upon request.

[4] OR estimate for "other" race/ethnicity is not available as all 17 respondents in this group reported using telehealth, and thus were dropped from the regression model.

0.10) than their White counterparts (Table 2B). High prevalence of TGH also was found among those with fair/poor health (69%) and single parents (62%), while low telehealth use was seen among residents of the Midwest and South (each 47%) (Table 1). In adjusted models, individuals with fair/poor self-rated health and women had greater odds of using TGH (AORs = 2.18 and 1.71, respectively; *p*'s < 0.05; Table 2B). Residents of the Midwest (vs. Northeast) were less likely to use TGH (AORs = 0.51, p < 0.05), and residents of the South and rural areas were marginally less likely (AORs = 0.55 and 0.30, *p*'s < 0.10).

Sensitivity analyses assessed potential bias from sparse data. The model from Table 2B predicting delayed healthcare due to cost has an outcome EPV (event per variable) <10, and the model predicting TBH use has an EPV <5, which is concerning given its small negative outcome sample size ($n = 34$; Supplemental Table S1 available online). To assess bias, we compared adjusted ORs to unadjusted ORs from models with each predictor entered separately.(Greenland et al., 2016) The large AOR for Hispanic/Latinx TBH use (11.96, p < 0.05, Table 2B) was quite similar to the unadjusted OR of 9.36 (p < 0.05; Supplemental Table S2 available online), suggesting it is a plausible estimate.

Additional sensitivity analyses addressed potentially endogenous variables. When we removed usual source of primary care from models of delayed care, results were robust although negative effects of younger age and uninsured status became stronger when predicting perceived need for general healthcare (Supplemental Table S3 available online). When we omitted pandemic-related reductions in work/pay from models, all results were robust (not shown).

4. Discussion

This study highlights several important findings about healthcare receipt during the first year of the COVID-19 pandemic. First, among those who wanted or needed healthcare, a majority received general and behavioral healthcare, but nearly half (48%) delayed needed healthcare which might have exacerbated physical or behavioral health conditions. Notably, one-third of respondents did not receive needed behavioral healthcare. The striking, 25-percentage point gap between receipt of needed behavioral healthcare versus general healthcare could reflect insufficient supply of behavioral healthcare providers and cost barriers. A 2015 survey by the National Alliance on Mental Illness (NAMI) found provider non-acceptance of new clients and insurance plans posed severe barriers to mental healthcare,(National Alliance on Mental Illness, 2017) and that patients more often received mental healthcare out of network, with higher out-of-pocket costs (exceeding $200 per visit), compared to primary care or even specialty medical visits.(U.S. Centers for Medicare and Medicaid Services, 2020) This might explain why our bivariate results showed behavioral healthcare receipt was unrelated to insurance coverage but marginally and positively related to income.

Large healthcare disparities during COVID-19 were another key finding. Compared to White adults, Hispanic/Latinx adults had a 20- and 18-percentage point lower prevalence of receiving needed general and behavioral healthcare, respectively. Even larger was the 23-percentage point disparity in behavioral healthcare receipt by low-income (vs. high-income) groups; the latter greatly exceeded the 13-percentage point disparity in these groups' general healthcare receipt. These differential disparities by type of care are consistent with the greater out-of-pocket costs for behavioral versus general healthcare.(National Alliance on Mental Illness, 2017) Of note, the magnitude of disparities in healthcare access appears to have increased during COVID-19. An earlier national study of mental healthcare access revealed widening disparities from 2004 to 2012, culminating in a Hispanic/Latinx-White gap of approximately 11 percentage points,(Cook et al., 2017) and racial and ethnic disparities in general healthcare access appear smaller, particularly after the Affordable Care Act (e.g.,(Chen et al., 2016)).

Importantly, our survey results suggest that telehealth might have prevented further widening of the disparities in behavioral healthcare receipt during the pandemic. As reported by others, telehealth use was much more common for behavioral health than general health.(Samson et al., 2021) Unexpectedly, Hispanic/Latinx and low-income persons—groups with the highest unmet need for behavioral healthcare in our sample— had the highest use of *tele*-behavioral healthcare. In post-hoc analyses of respondents who perceived need for behavioral healthcare (regardless of whether they received it), we found the Hispanic-White disparity in *tele*-behavioral healthcare receipt was *two-thirds less* than the Hispanic-White disparity in receiving *any* behavioral healthcare (6.3 vs. 18.1 percentage points). This suggests that telehealth increased Hispanic/Latinx patients' access to behavioral healthcare, thereby limiting growth in the Hispanic-White disparity in behavioral healthcare receipt during COVID-19. Additionally, there was virtually no disparity in telehealth use for *general* healthcare (47.6% of Hispanic/Latinx and 45.8% of White respondents). These findings corroborate a Medicare study showing greater telehealth use by Hispanic/Latinx (vs. White) patients in both rural and urban areas,(Samson et al., 2021) and also the CDC's Household Pulse Surveys from the later-COVID period (Spring 2021-July 2022) showing higher levels of telehealth use by Hispanic (vs. White) respondents in virtually all survey waves.(Centers for Disease Control and Prevention, 2022) By contrast, CDC surveys from the early-COVID period (June–August 2020) indicate *less* access to telehealth by Hispanic/Latinx (vs. White) respondents.(Centers for Disease Control and Prevention, 2021)

These results are encouraging, given pre-pandemic concerns that telehealth expansion might create disparities in healthcare access due to the US digital divide. Our findings of higher-than-expected telehealth use by Hispanic/Latinx and low-income populations during COVID-19 might be explained by PHE policies increasing reimbursable telehealth services (including telephone visits) and in settings such as federally qualified health centers serving lower-income communities and rural health clinics.(California Department of Health Care Services, 2021)

Some telehealth disparities were noted, however. Compared to White patients, Black patients had similar prevalence of telehealth use for general care but not behavioral healthcare (although the latter was not statistically significant), and for both types of care, telehealth use by Hispanic/Latinx patients exceeded that of Black patients. This might reflect ethnic differences in sensitive healthcare topics and preferences for discussing them in person versus by telephone or video. Post-hoc analysis suggests regional differences also might matter, as Black and White respondents were more likely to reside in the southern US, while Hispanic respondents were more likely to live in the Pacific and Northeast regions where telehealth was more prevalent (data not shown). While our tentative finding of Black-White disparities in telehealth use is supported by a recent Medicare study,(Samson et al., 2021) it is not consistent with CDC survey data from a late-COVID period (April–October 2021, after our N14C survey) showing similar or greater telehealth use by Black (vs. Hispanic/Latinx) patients that exceeded White patients' telehealth use.(Centers for Disease Control and Prevention, 2022; Karimi et al., 2022) Our rural-urban findings also were only partly consistent with claims data from the early-COVID period indicating rural-urban disparities.(Patel et al., 2021; Cantor et al., 2021; Samson et al., 2021) While we found marginally significant, lower tele-behavioral healthcare receipt by rural (vs. urban) residents, telehealth use for general care was identical across both groups (54%). Future study of telehealth disparities is needed using general population surveys and claims data, and with close attention to possible changes in disparities over time to examine benefits of wider telehealth availability as the PHE progressed.

Finally, differences in the magnitude of disparities in telehealth versus *any* healthcare receipt suggest sizeable disparities in *in-person* care during the first year of the pandemic. Future research should assess whether such disparities persist after the PHE has ended and consider quality differences between telehealth (video and telephone visits) and in-person care. Recent reports suggest socioeconomic disparities in virtual visits versus telephone visits during the PHE,(Darrat et al., 2021; Rodriguez et al., 2021) and that optimizing virtual care for all will

require addressing needs of groups with limited broadband connectivity, digital literacy and English proficiency.(Webber et al., 2022; Payán et al., 2022) Until then, reliance on video visits to bridge service gaps might inadvertently exclude groups for whom telephone visits are a vital conduit to care.(Payán et al., 2022) To advance healthcare equity, federal agencies and commercial payers should consider payment parity for telephone, video, and in-person visits and waiver of telehealth copays beyond the PHE.(Anthony, 2020; Park et al., 2018; Darrat et al., 2021; Rodriguez et al., 2021) Government investment in telehealth infrastructure and technical assistance for health centers, and collaboration between healthcare agencies and community organizations working to address the digital divide(Park et al., 2018; Rodriguez et al., 2021) might also help ensure telehealth after the PHE is viable and utilized by otherwise underserved populations. Provider and patient incentives for cost-effective telehealth use might also be considered to offset system costs of telehealth expansion.

Study limitations should be considered. As most N14C respondents were interviewed over a 3-week period in February 2021, our findings on healthcare received since April 2020 could differ from studies conducted at different stages of the pandemic. Second, the sample size is relatively small, especially for assessing differential telehealth use among respondents who received any behavioral healthcare. Our findings of greater use of tele-behavioral healthcare by Hispanic/Latinx respondents, while consistent with some reports after the early-COVID period, are based on small numbers and should be viewed cautiously and confirmed in future studies with larger samples. Third, although our use of pre-COVID measures (e.g., self-rated health) to predict subsequent healthcare utilization can help reduce concerns about reverse causation, health insurance and income could have changed for the worse during the pandemic, possibly resulting in conservative estimates of healthcare disparities during COVID-19. A strength of our study is its focus on behavioral healthcare using general population, individual-level survey data, which complement claims data. Some claims studies rely upon area-level demographic characteristics and their findings might not generalize to lower-income populations who are publicly insured or uninsured. Another notable feature is our assessment of healthcare receipt by those who wanted care. More objective indicators of healthcare needs do not necessarily align with self-perceived need (e.g., see (Edlund et al., 2009) for alcohol use disorder) and may warrant interventions that increase health problem recognition. N14C data confirm a lack of concordance between subjective and objective need; for example, only 48% of persons with anxiety symptoms and 26% of persons with alcohol use disorder reported wanting/needing behavioral healthcare. We focused on healthcare receipt among those with self-reported need, as results have clearer implications for healthcare access.

5. Conclusion

Many people who wanted behavioral healthcare and general healthcare during the first year of the COVID-19 pandemic received some care, but many people delayed care. While delays were more commonly due to lockdowns and fear of COVID-19, some delays were driven by cost, especially among uninsured persons, young adults, rural residents, and persons whose employment was impacted during COVID-19. This highlights the importance of multisectoral interventions to reduce financial barriers to care. Disparities in receipt of care also were apparent, particularly for Hispanic/Latinx, lower-income persons, adults ages 35–49, and those with no usual source of primary care. Our findings suggest that telehealth might provide a bridge to healthcare and help reduce such disparities,(Seshamani, 2022) especially in behavioral healthcare. Ongoing monitoring of access to general and behavioral healthcare is needed to evaluate whether telehealth reduces or increases disparities in access to these types of care for underserved groups.

CRediT authorship contribution statement

Nina Mulia: Conceptualization, Methodology, Formal analysis, Writing – original draft, Writing – review & editing, Funding acquisition. **Yu Ye:** Conceptualization, Methodology, Formal analysis, Writing – original draft, Writing – review & editing. **Thomas K. Greenfield:** Conceptualization, Methodology, Formal analysis, Writing – review & editing. **Priscilla Martinez:** Data curation, Writing – review & editing. **Deidre Patterson:** Data curation, Writing – review & editing. **William C. Kerr:** Writing – review & editing, Funding acquisition. **Katherine J. Karriker-Jaffe:** Conceptualization, Methodology, Formal analysis, Writing – review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

The data analyzed for this study will be made available in the future through the NIH data archive and from the Alcohol Research Group.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ypmed.2023.107426.

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