Impact of COVID-19 on People Living With HIV: Data From Five Medical Monitoring Project Sites, 2020–2022

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Background: The COVID-19 pandemic disrupted global economic and healthcare systems. People living with HIV (PLWH) represent a marginalized and stigmatized population who may have been particularly impacted. The purpose of this analysis was to describe the impact of the COVID-19 pandemic on PLWH in the United States.

Setting: United States.

Methods: We analyzed surveys of behavioral and clinical characteristics of PLWH residing in 5 states that participated in the Medical Monitoring Project between 2020 and 2022. We described the impact of COVID-19 illness, testing, and diagnoses; receipt of medical care; social service access; employment; and preventive measures by project site and demographic characteristics.

Results: Unweighted data from 1715 PLWH were analyzed. A high proportion of PLWH had medical care disrupted by the pandemic; 31% of PLWH missed medical appointments, 26% missed routine laboratory test results, and 7% missed antiretroviral therapy doses. In total, 30% of PLWH reported losing wages and 19% reported difficulty in accessing social services. Overall, 88% reported receiving at least 1 dose of COVID-19 vaccine, but vaccine uptake was low among younger, Black, and Hispanic or Latina/o/x PLWH.

Conclusions: This descriptive analysis reinforces previous findings that show that COVID-19 negatively impacted PLWH and their ability to obtain medical care. Additional efforts will be critical to ameliorating the longer-term impacts of COVID-19 on the health of PLWH and supporting PLWH through future pandemics and healthcare system disruptions.

Key Words: COVID-19, pandemic, disruptions to care

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INTRODUCTION

The COVID-19 pandemic disrupted the healthcare system nationally and globally.[1] This disruption was especially harmful for those with preexisting medical conditions and communities marginalized by systemic discrimination.[2] The initial uncertainties of how COVID-19 would impact people living with HIV (PLWH) compounded the overarching anxieties of the novel pandemic.[3] As the pandemic progressed, it was evident that PLWH were at greater risk of severe illness and death from COVID-19 compared with people not living with HIV.[4–7] In addition to the increased risk of severe COVID-19 outcomes, the psychosocial stressors and disruption to HIV and non-HIV care brought barriers to the health and well-being of PLWH.[2]

While expansion of innovated approaches to health care, such as telehealth,[8,9] was implemented to address disruptions in care, other factors such as sudden job loss, changes in health insurance, and interrupted ancillary services also contributed to health concerns.[10–12] Disruptions in HIV diagnosis, preexposure prophylaxis prescriptions, antiretroviral therapy (ART) prescriptions, and clinical services have been documented since the onset of COVID-19, as well as estimated excess death from COVID-19 in PLWH.[13–17] In the United States (US), unmet needs for ancillary services were already established risk factors for poor HIV outcomes.[18,19] The intersecting vulnerabilities of disrupted HIV care, interrupted ancillary services, and potential job loss or pay reduction raised concern for PLWH who already face HIV-related stigma in and out of the healthcare system and increased risk of comorbidities.[2,20,21] When COVID-19 vaccines became public, health authorities found public acceptance and dispersion of vaccines were suboptimal due to mistrust and safety and efficacy concerns.[22] For PLWH who had compromised immune systems, concerns about vaccine safety and efficacy were amplified.[7]

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We conducted this analysis to provide insight on the impact of COVID-19 directly from PLWH based on a sample of 5 Medical Monitoring Project (MMP) sites across 2 project cycle years of data collection, from mid-2020 through mid-2022. Our goal was to better understand the extent to which PLWH were impacted by the COVID-19 pandemic. The areas of impact we examined were COVID-19 illness, testing, and diagnoses; receipt of medical care including medications; social services access; employment and financial wellbeing; and preventive measures including vaccine uptake among PLWH. Although the impact of COVID-19 has evolved since the onset, with dynamic strategies implemented to improved healthcare delivery and decrease vaccine hesitancy, these findings provide insight directly from PLWH during the beginning of the COVID-19 pandemic.

METHODS

This analysis was based on data collected as part of the MMP between June 2020 and May 2022. MMP is an annual cross-sectional survey designed to produce representative estimates of behavioral and clinical characteristics of adults with diagnosed HIV in the United States.[23] MMP is funded and coordinated by the Centers for Disease Control and Prevention. The survey is offered to simple random samples of PLWH reported to the National HIV Surveillance System within the participating jurisdictions. All surveys in 2020 were administered through phone interview, and although face-to-face interviews were permitted in 2021, interviews continued to be conducted predominantly through phone. Participants were offered a $50 token of appreciation for the time they spent completing the interview. Verbal or written consent, for both the interview and the medical record review, was obtained from all participants before enrollment in MMP.

MMP sites have the option of adding a small number of questions to the interview that are of local interest. These questions are limited to no more than 10 minutes of the participants' time. At least 6 of the 23 project areas opted to add similar questions about the impact of the COVID-19 pandemic starting in the 2020 cycle. Five of the MMP sites that added COVID-19–related questions agreed to participate in this analysis with a total of 1714 participants, including from California (CA, N = 403, excludes San Francisco and Los Angeles), New York City (NYC, N = 462), Oregon (OR, N = 364), Philadelphia (N = 204), and Washington (WA, N = 281). The response rate among eligible sampled persons in 2020 for the 5 sites was 38% (922 of 2416) ranging from 31% to 47%. In 2021, the overall response rate was 42% (827 of 1979) and site-specific response rates ranged from 34% to 52%. MMP analysis methods usually include weighting to adjust for nonresponse bias and poststratification weights for sex at birth, age at interview, and race/ethnicity; however, weights developed for the Centers for Disease Control and Prevention were not available at the time of analyses. As a result, if the frequency of the variables we examine in this analysis differs across the demographic strata used for weighting, our findings may not be representative of all PLWH in the MMP study areas.

Each site compiled a list of COVID-19–related questions (see Table 1, Supplemental Digital Content, http://links.lww.com/QAI/C256), and we cross tabulated these with selected covariates. These analyses were conducted using SAS (SAS version 9.4 Cary, NC). The covariates examined were gender (self-reported), age, race/ethnicity, annual income, education, antiretroviral use at the time of interview, housing status, depression (Patient Health Questionnaire 8 score of 9 or above), project cycle (2020 or 2021), and if the participant reported 1 or more of 6 disabilities. These disabilities are limited to those participants deemed serious/severe, including (1) blindness or difficulty seeing even with corrective lenses, (2) deafness or difficulty hearing, (3) concentration or memory difficulties, (4) mobility issues for walking or stair climbing, (5) difficulty dressing or bathing, and (6) difficulty doing errands independently.

The COVID-19–related questions varied site to site and across the 2 cycle years (see Table 1, Supplemental Digital Content, http://links.lww.com/QAI/C256). COVID-19–related questions included COVID-19 exposures, testing, diagnoses, and interruptions in social and medical services. We present the overall proportion answering positively to COVID-19–related stressors stratified by selected covariates and site. When participants declined to answer a question or did not know the answer to the question, they were excluded. This occurs in less than 2% of responses for every question except for reason for not getting vaccinated (12%, see Table 1, Supplemental Digital Content, http://links.lww.com/QAI/C256). MMP data collection is routine public health surveillance and, thus, not considered research.[24]

RESULTS

Participant Characteristics

Participants across all sites were predominantly cisgender men (76%) and 50 years and older (63%; Table 1). NYC and Philadelphia had a greater proportion of female participants (34%) relative to 13%–16% in CA, OR, and WA. Across all sites, there were 18 participants (1%) who were transgender or nonbinary. Overall, 40% were White, 29% Black, 26% Hispanic or Latina/o/x, and 4% other racial groups. Race and ethnicity varied by site. Thirty-eight percent of participants reported a household income of <$20,000 per year. Educational attainment varied by region with 47% and 52% of Philadelphia and NYC participants reporting any college, respectively, versus 71%–73% of participants from CA, OR, and WA. Almost all participants (97%; range 97%–98%) reported current antiretroviral use.

Forty-three percent of participants reported a disability (range: 36%–54%), the most common being difficulty walking or climbing stairs (79% of those reporting disabilities, data not presented in tables). A total of 7% (range: 4%–10%) reported being unhoused or living in unstable housing situations, such as couch surfing, or staying in a shelter or a single room occupancy hotel.

COVID-19 Exposure, Symptoms, Testing, and Diagnosis

Twenty-one percent reported exposure to COVID-19 (close contact to someone with COVID-19) over the 2 project

TABLE 1. Demographic Characteristics by MMP Site: California, New York City, Oregon, Philadelphia, and Washington 2020–2022*

	CA		NYC		OR		Philadelphia		WA		Total	
	N	(%)	N	(%)	N	%	N	(%)	N	(%)	N	(%)
Total	403	100	462	100	364	100	205	100	281	100	1715	100
Gender												
Cisgender men	332	83	294	64	311	85	135	66	235	84	1307	76
Cisgender women	62	16	155	34	48	13	69	34	43	15	377	22
Other gender	5	1	9	2	4	1	1	<1	3	1	22	1
Age in yr												
18-29	30	8	21	5	10	3	15	7	13	5	89	5
30-39	56	14	69	15	67	18	33	16	41	15	266	16
40-49	74	18	65	14	53	15	38	19	56	20	286	17
50+	243	60	307	66	234	64	119	58	171	61	1074	63
Race/ethnicity												
White	154	38	58	13	257	71	33	16	177	63	679	40
Black	61	15	231	50	27	7	135	66	45	16	499	29
Hispanic Latina/o/x	167	42	161	35	49	13	31	15	46	16	454	26
Other	21	5	12	3	11	3	6	3	13	5	63	4
Annual income												
$0 to 19,999	119	33	242	52	134	37	81	40	84	30	660	38
$20,000 to 39,999	71	19	73	16	91	25	62	30	77	27	374	22
$40,000 to 74,999	76	21	54	12	93	26	44	21	79	28	346	20
$75,000 +	98	27	22	5	28	8	3	1	31	11	182	11
Education												
<High school	43	11	108	23	25	7	31	15	22	8	229	13
High school/GED	74	18	113	24	74	20	77	38	55	20	393	23
Any college	282	71	238	52	265	73	97	47	203	72	1085	63
Current antiretroviral use												
Yes	392	97	448	97	354	97	199	97	274	98	1667	97
No	11	3	14	3	10	3	6	3	7	2	48	3
Disability status†												
Any	141	36	251	54	145	40	90	44	112	40	739	43
None	254	64	209	45	219	60	114	56	167	59	963	56
Housing												
Housed	376	94	414	90	350	96	188	92	263	94	1591	93
Unhoused or unstably housed	24	6	48	10	14	4	17	8	17	6	120	7
Depression‡												
Yes	43	11	47	10	67	18	31	15	44	16	232	14
No	358	89	414	90	295	81	173	84	236	84	1476	86
Sex with man in P12M												
Yes	18	5	120	26	159	56	65	32	114	41	476	29
No	382	96	342	74	124	44	138	68	167	59	1153	71
Injection drug use in P12M												
Yes	0	0	11	2	20	6	5	2	16	6	52	3
No	400	100	451	98	343	94	198	98	265	94	1657	97
Project cycle												
2020–2021	189	47	225	49	174	48	74	36	146	52	808	47
2021–2022	214	53	237	51	190	52	131	64	135	48	907	53

*Data Collected from a cross sectional survey of PLWH reported to state and local health departments between 2020 and 2021.

†Disability defined as self-reporting any 1 of 6 conditions: (1) blindness or difficulty seeing even with corrective lenses, (2) deafness or difficulty hearing, (3) concentration or memory difficulties, (4) mobility issues for walking or stair climbing, (5) difficulty dressing or bathing, and (6) difficulty doing errands independently.

‡Depression was measured using the Patient Health Questionnaire 8 scale with depression being defined as a score of 9 or higher.

IDU, injection drug use; MSM, Male–male sexual contact.

cycles (19% in 2020 and 25% in 2021, data not presented in tables). NYC participants most often reported COVID-19 exposure (24%), while Washington state participants reported COVID-19 exposure the least (16%). Overall, 20% reported ever having COVID-19 symptoms, 61% reported any COVID-19 testing, and 8% reported a COVID-19 diagnosis. Diagnoses of COVID-19 increased from 5% to 12% over the 2 MMP cycles.

Wage Loss and Social Service Interruptions

Almost one-third (30%) of project participants reported losing one or more weeks of wages due to COVID-19 (Table 2). More male participants (33%) than female participants (17%) lost wages. Participants age 18–29 years more often lost wages (40%) compared with those 50 years and older (25%). Across income categories, wage loss was highest in those with a household income of $20,000-$39,000 (38%); across education categories, those with any college education (31%) most frequently reported wage loss (23% among those with less than high school education, 26% among those with high school education).

A total of 19% of participants reported difficulty in accessing case management and other social services due to COVID-19. Participants in NYC were more often reported issues in accessing services (26%) relative to those in CA, WA, OR, and Philadelphia (14%–17%). Participants age 18–29 years (24%), participants not currently taking antiretroviral therapy (34%), people who were unhoused or unstably housed (34%), and those with symptoms of depression (35%) most often reported issues in accessing case management and other social services.

COVID-19's Impact on Medical Care

Relatively few MMP participants missed doses of their antiretroviral therapy or other medications (7%) or had problems getting refills of ART (8%; Table 3). Groups with more difficulty getting refills largely overlapped with those missing doses of ART and other medications, including individuals 30–39 years, Hispanic or Latina/o/x participants, individuals not currently taking antiretrovirals, individuals with disabilities, individuals with symptoms of depression, and individuals living unhoused or with unstable housing.

Nearly one-third of participants (31%) missed one or more medical appointments due to COVID-19; 60% used telemedicine in place of in-person visits and 26% skipped or delayed routine HIV-related medical laboratory tests, CD4 counts, or viral loads, due to COVID-19 (Table 3). Women and individuals with symptoms of depression missed medical appointments (36% and 54%, respectively) and used telemedicine the more frequently than men and individuals with no symptoms of depression (67% and 68%). Compared with participants with lower incomes, those with household incomes greater than or equal to $75,000 more often missed appointments (40%) and less often used telemedicine (48%). Unhoused/unstably housed participants more often miss appointments due to COVID-19 (43%) and less often used telemedicine (48%) as compared with those with stable housing. Participants aged 30–39 years (37%), White participants (31%), those with less than a high school diploma (31%), participants not currently using ART (56%), people living unhoused or unstably housed (46%), and people with symptoms of depression (45%) skipped or delayed routine HIV laboratory tests more often than others.

Vaccination Status and Attitude Toward Vaccination

Overall, 88% reported receiving at least 1 dose of a COVID-19 vaccine (Table 4), ranging from 84% in NYC to 93% in Washington. Of the age groups, participants aged 30–39 years were the least likely to be vaccinated (77%); White participants (94%) and those in middle income categories (household income of $20,000-$74,999; 93%–96%) were more likely to be vaccinated as compared with other race and income categories. Ninety-two percent of participants agreed that the vaccine was somewhat to very effective in preventing COVID-19. A lower proportion of participants younger than 40 years (85%) and participants who were unhoused or unstably housed (85%) were confident in the vaccine's efficacy. Ninety-three percent of participants agreed that the vaccine was safe.

In NYC, 32 of 37 unvaccinated participants gave one or more reasons why they were not yet vaccinated (data not presented in tables). These included 14 people who were worried about side effects, 11 people concerned about the vaccine's safety or efficacy, and 10 people who did not think that COVID-19 posed a risk to their health. In WA, of the 6 unvaccinated participants who were not planning to get vaccinated, 2 had safety or trust concerns, 2 were concerned about side effects, and 1 reported a history of COVID-19 illness and logistics as reasons why they planned to remain unvaccinated. The results of each question stratified by MMP site can be found in Table 2, Supplemental Digital Content, http://links.lww.com/QAI/C256.

DISCUSSION

In a large, diverse sample of PLWH across 3 Western states and 2 Northeastern cities in the United States, COVID-19 had a wide-ranging impact on health, income, access to social services, and medical care. While 21% of PLWH reported close contact with someone with COVID-19 and symptoms possibly consistent with COVID-19, only 8% reported a COVID-19 diagnosis. For example, in New York State, 2.8% of PLWH had been diagnosed with COVID-19 by June 7, 2020.[25] In an international trial among PLWH where all participants were assessed for COVID-19, 13.1% had either a clinical diagnosis of COVID-19 or serologic evidence of COVID-19 infection in the absence of prior vaccination in the first 3 months of the pandemic.[26]

The economic impact of the COVID-19 pandemic disproportionately affected PLWH. One-quarter of US adults reported that they or someone in their household was laid off or lost their job because of the COVID-19 pandemic with 15% reporting that they experienced this personally.[27] By contrast, 30% of PLWH in this study reported that they personally lost wages (OR also included people in their

TABLE 2. Loss of Wages for 1 Week or More and Difficulty Accessing Case Management and Other Social Services Due to COVID-19 Among PLWH Across Five MMP Sites, 2020–2021*

	Lost 1+ Week Wages (%)	Problems Accessing Social Services (%)
Total (%)	30	19
Gender		
Cisgender men	33	18
Cisgender women	17	21
Age in yr		
18–29 yo	40	24
30–39 yo	38	19
40–49 yo	36	19
50+	25	18
Race/ethnicity		
White	32	15
Black	24	19
Hispanic or Latina/o/x	34	25
Other	30	13
Income		
0 to $19,999	24	25
$20,000 to $39,999	38	16
$40,000 to $74,999	33	13
$75,000 and more	26	5
Education		
<High school	23	21
High school/GED	26	19
Any college	31	19
Current antiretroviral use		
Yes	30	18
No	23	34
Disability status†		
No serious disabilities	35	14
Any serious disabilities	23	25
Unstable housing		
Yes	35	34
No	29	17
Depression‡		
Yes	31	35
No	29	17
Project cycle		
2020	30	15
2021	29	19

*Data Collected from a cross sectional survey of PLWH reported to state and local health departments in California, New York City, Oregon, Philadelphia, and Washington state between 2020 and 2021. Both questions were administered in all 5 programs.

†Disability defined as self-reporting any 1 of 6 conditions: (1) blindness or difficulty seeing even with corrective lenses, (2) deafness or difficulty hearing, (3) concentration or memory difficulties, (4) mobility issues for walking or stair climbing, (5) difficulty dressing or bathing, and (6) difficulty doing errands independently.

‡Depression was measured using the Patient Health Questionnaire 8 scale with depression being defined as a score of 9 or higher.

household). This estimate is similar to that obtained in a survey of lesbian, gay, bisexual, transgender and queer and other gender/sexual minority people (LGBTQ+) that also illustrated a disproportionate impact of job loss on PLWH.[2] It is important to note, however, that our analysis was not able to assess what proportion of PLWH was initially employed for wages; the proportion of those who were not employed at the outset of the COVID-19 pandemic (and were thus not at risk of losing income) may have differed across subgroups. Our study also indicates that wage loss was greater among PLWH who are younger, lower-income, Hispanic or Latina/o/x, and unstably housed. Wage loss may also exacerbate symptoms of depression, anxiety, and stress, all of which are more common among PLWH.[20,28] Such worsening of unmet social and economic needs is associated with HIV viremia and potentially has slowed progress in ending the HIV epidemic in the United States.[18]

Access to social services is one way to buffer the adverse impact of economic hardship. Almost one-fifth of participants reported being unable to access social services like counseling, housing support, food resources, and case management due to COVID-19. Disrupted access to social services was greatest among those who may have needed them most, including PLWH who are younger, Black, Hispanic or Latina/o/x, unstably housed, living with a disability, not taking ART, and experiencing symptoms of depression.

Disruptions to medical care may have further exacerbate the health and social impacts of COVID-19 on PLWH. While 26% delayed routine laboratory test results and 31% missed a medical appointment, 60% reported using telemedicine for care. Rapid implementation of telemedicine allowed patients to remain engaged in care throughout COVID-19. This may be a contributing factor in the rebound in utilization of HIV medical services seen as the pandemic progressed.[10] Relationships with clinical staff are critical for maintaining trust in healthcare providers, sharing information about COVID-19 and its impacts on PLWH, and, for some, social connectedness. Studies indicate that telemedicine is acceptable and sometimes preferred by PLWH given the convenience of not having to travel, scheduling flexibility, and receiving care in one's home or other preferred space.[29–31] PLWH may also experience less stigma in receiving care remotely rather than going to a clinic known in the community for providing HIV care. Further evaluations of HIV clinical outcomes by visit mode (in-person, phone visit, video visit) may provide insights on how best to deliver HIV care and case management. Of concern is further disruption to patients using telemedicine as the federal COVID-19 public health emergency ends and may impact reimbursement for phone visits.

PLWH are a priority group for COVID-19 vaccination.[32] Vaccination uptake of at least 1 vaccine dose was high among PLWH and greater than more recent estimates of vaccine uptake among the US population.[33] Other studies have shown that vaccine confidence, intention, and uptake are lower among PLWH compared with people without HIV, while others show

TABLE 3. Medical Impacts of COVID-19 Disruption Among PLWH Across Five MMP Sites, 2020–2021*

Variable	Value	Missed ART/ Medication (%)	Problems Getting ART Refills (%)	Missed Doses of Non-HIV Medications (%)	Missed Medical Appointment(s) (%)	Used Telemedicine (%)	Missed Routine Laboratory Test Results (%)
Total	%	7	8	7	31	60	26
Gender	Cisgender men	7	8	6	31	56	26
	Cisgender women	7	9	8	36	67	25
Age in yr	18–29	3	5	2	39	39	27
	30–39	10	13	10	35	57	37
	40–49	9	10	9	27	52	25
	50+	6	7	6	34	64	24
Race/ ethnicity	White	6	8	6	36	65	31
	Black	6	6	5	31	60	22
	Hispanic or Latina/o/x	10	11	9	36	57	29
	Other	7	16	10	28	61	14
Income	0 to $19,999	9	7	7	34	56	27
	$20,000 to $39,999	6	9	7	27	69	25
	$40,000 to $74,999	6	10	7	31	70	24
	$75,000 and more	8	8	3	40	48	28
Education	<High school	7	8	6	35	54	36
	High school/ GED	7	8	6	33	61	25
	Some college+	6	9	7	33	62	30
Disability status†	Any	11	9	11	38	62	29
	None	3	8	3	28	58	21
Unstable housing	Yes	17	13	11	43	48	46
	No	6	8	6	32	61	22
Depression‡	Yes	19	13	19	54	68	45
	No	4	8	4	30	59	22
Project cycle	2020–2021	8	9	8	35	60	30
	2021–2022	5	8	5	31	60	22

*Data Collected from a cross sectional survey of PLWH reported to state and local health departments in California, New York City, Oregon, Philadelphia, and Washington state between 2020 and 2021. Questions about missed ART doses and missing laboratory test results were administered in Washington, New York City, Philadelphia, and California. Questions about problems getting refills were administered in Washington, Oregon, and Philadelphia. Questions about non-HIV medication and missed medical appointments were administered in NNew York City, Philadelphia, and California. Questions about telemedicine were administered in New York City and Philadelphia.

†Disability defined as self-reporting any 1 of 6 conditions: (1) blindness or difficulty seeing even with corrective lenses, (2) deafness or difficulty hearing, (3) concentration or memory difficulties, (4) mobility issues for walking or stair climbing, (5) difficulty dressing or bathing, and (6) difficulty doing errands independently.

‡Depression was measured using the Patient Health Questionnaire 8 scale with depression being defined as a score of 9 or higher.

that vaccine uptake is generally similar.[34–36] Like other studies, we found that vaccine uptake was lower among younger PLWH and Black and Hispanic or Latina/o/x PLWH.[35] Owing to the increased morbidity of COVID-19 among PLWH, further research would be useful to understand the remaining barriers and hesitancy toward COVID-19 vaccination in this population.[37]

Our work is subject to several limitations. First, our five-site sample represents only the western and northeastern United States and leaves out other regions with a large populations of PLWH. In addition, although MMP participants are selected regardless of their engagement in medical care, the analysis is unweighted and is predominantly comprised PLWH who are receiving medical care and taking ART. Compared with US PLWH in 2019, the current sample had similar percentages of cisgender women and Hispanic or Latina/o/x people, but a lower percentage of Black people (40% among US PLWH, 29% in the current sample) and a greater percentage of PLWH 50 years and older (52% among US PLWH, 63% in the current sample).[38] Therefore, our sample may underrepresent the COVID-19–related experiences of Black PLWH

TABLE 4. COVID-19 Vaccination Status and Confidence in Vaccine Efficacy and Safety Among PLWH Across Five MMP Sites, 2020–2021*

	Vaccinated With at Least 1 Dose (%)	Believe Vaccine Effective (%)	Believe Vaccine Safe (%)
Total (%)	88	92	93
Gender			
Cisgender men	91	90	92
Cisgender women	80	97	95
Age in yr			
18–29	86	85	92
30–39	77	85	85
40–49	86	91	92
50+	92	94	95
Race/ethnicity			
White	94	91	95
Black	86	93	94
Hispanic or Latina/o/x	85	94	90
Other	88	73	80
Income			
0 to $19,999	83	93	92
*$20,000 to $39,999	93	93	96
$40,000 to $74,999	96	88	91
$75,000 and more	85	100	100
Education			
<High school	85	92	94
High school/GED	90	91	91
Any college	92	92	93
Current antiretroviral use			
Yes	89	91	93
No	85	100	100
Disability status†			
Any	86	93	91
None	90	91	94
Unstable housing			
Yes	86	85	85
No	91	92	94
Depression‡			
Yes	84	93	89
No	92	92	94

*Data Collected from a cross sectional survey of PLWH reported to state and local health departments between 2020 and 2021. Questions about vaccination status were administered in Washington, New York City, and California. Questions about vaccine beliefs were administered in Oregon and New York City.

†Disability defined as self-reporting any 1 of 6 conditions: (1) blindness or difficulty seeing even with corrective lenses, (2) deafness or difficulty hearing, (3) concentration or memory difficulties, (4) mobility issues for walking or stair climbing, (5) difficulty dressing or bathing, and (6) difficulty doing errands independently.

‡Depression was measured using the Patient Health Questionnaire 8 scale with depression being defined as a score of 9 or higher.

and overrepresent the experiences of older PLWH. Of note, older PLWH who were diagnosed before the invention of effective treatment have unique perspectives and barriers stemming from their experiences, which could influence employment, mental health, and trust in the medical system. The high rate of vaccination in the sample may also reflect the high rate of vaccination among older adults in the United States.[39] Second, our response rates were slightly lower than prior years largely due to reassignment of MMP data collection staff to the COVID-19 and mpox emergency responses during both cycles. Finally, MMP sites shared aggregate rather than line-level data. Therefore, we were not able to perform regression analyses nor examine the intersections of the social characteristics and their associations with the impacts of COVID-19 on the lives of PLWH.

In conclusion, a study of PLWH in 3 Western states and 2 Northeastern cities assessed several short-term effects of COVID-19 on health, healthcare access, economics, and supportive services among PLWH. Further study is critical to understanding the longer-term impacts of COVID-19 on the health and wellbeing of PLWH and identifying approaches to support PLWH through future pandemics and healthcare system disruptions.

REFERENCES

1. Zhu N, Zhang D, Wang W, et al. A novel coronavirus from patients with pneumonia in China, 2019. *N Engl J Med*. 2020;382:727–733.
2. Winwood JJ, Fitzgerald L, Gardiner B, et al. Exploring the social impacts of the COVID-19 pandemic on people living with HIV (PLHIV): a Scoping review. *AIDS Behav*. 2021;25:4125–4140.
3. Lesko CR, Tong W, Moore RD, et al. Retention, antiretroviral therapy use and viral suppression by history of injection Drug use among HIV-infected patients in an urban HIV clinical cohort. *AIDS Behav*. 2017;21: 1016–1024.
4. Yang X, Sun J, Patel RC, et al. Associations between HIV infection and clinical spectrum of COVID-19: a population level analysis based on US National COVID Cohort Collaborative (N3C) data. *Lancet HIV*. 2021;8: e690–e700.
5. Waterfield KC, Shah GH, Etheredge GD, et al. Consequences of COVID-19 crisis for persons with HIV: the impact of social determinants of health. *BMC Public Health*. 2021;21:299.
6. Mirzaei H, McFarland W, Karamouzian M, et al. COVID-19 among people living with HIV: a systematic review. *AIDS Behav*. 2021;25:85–92.
7. Shrestha R, Meyer JP, Shenoi S, et al. COVID-19 vaccine hesitancy and associated factors among people with HIV in the United States: findings from a national survey. *Vaccines (Basel)*. 2022;10:424.
8. Dandachi D, Freytag J, Giordano TP, et al. It is time to include telehealth in our measure of patient retention in HIV care. *AIDS Behav*. 2020;24: 2463–2465.
9. Mgbako O, Miller EH, Santoro AF, et al. COVID-19, telemedicine, and patient empowerment in HIV care and research. *AIDS Behav*. 2020;24: 1990–1993.
10. Hoover KW, Zhu W, Gant ZC, et al. HIV services and outcomes during the COVID-19 pandemic: United States, 2019-2021. *Morb Mortal Wkly Rep*. 2022;71:1505–1510.
11. Frost MC, Sweek EW, Austin EJ, et al. Program adaptations to provide harm reduction services during the COVID-19 pandemic: a qualitative study of syringe services programs in the U.S. *AIDS Behav*. 2022;26:57–68.
12. Meyer D, Slone SE, Ogungbe O, et al. Impact of the COVID-19 pandemic on HIV healthcare service engagement, treatment adherence, and viral suppression in the United States: a systematic literature review. *AIDS Behav*. 2023;27:344–357.
13. Goodreau SM, Delaney KP, Zhu W, et al. Impacts of COVID-19 on sexual behaviors, HIV prevention and care among men who have sex with men: a comparison of New York City and Metropolitan Atlanta. *PLoS One*. 2023;18:e0282503.
14. Huang YLA, Zhu W, Wiener J, et al. Impact of coronavirus disease 2019 (COVID-19) on human immunodeficiency virus (HIV) pre-exposure prophylaxis prescriptions in the United States-A time-series analysis. *Clin Infect Dis*. 2022;75:e1020–e1027.
15. Zhu W, Huang YLA, Wiener J, et al. Impact of the coronavirus disease 2019 pandemic on prescriptions for antiretroviral drugs for HIV treatment in the United States, 2019-2021. *AIDS*. 2022;36:1697–1705.
16. Zhu W, Huang YLA, Song R, et al. An estimate of excess deaths among people with HIV during the coronavirus disease 2019 pandemic in the United States, 2020. *AIDS*. 2023;37:851–853.
17. Viguerie A, Song R, Johnson AS, et al. Isolating the effect of COVID-19-related disruptions on HIV diagnoses in the United States in 2020. *J Acquir Immune Defic Syndr*. 2023;92:293–299.
18. Dasgupta S, Crim SM, Dawson L, et al. Unmet needs for HIV ancillary care services by healthcare coverage and Ryan White HIV/AIDS program assistance. *AIDS*. 2022;36:1399–1407.
19. Dasgupta S, Tie Y, Beer L, et al. Unmet needs for ancillary care services are associated with HIV clinical outcomes among adults with diagnosed HIV. *AIDS Care*. 2022;34:606–614.
20. McDowell CP, Herring MP, Lansing J, et al. Associations between employment changes and mental health: US data from during the COVID-19 pandemic. *Front Psychol*. 2021;12:631510.
21. Martino RJ, Krause KD, Griffin M, et al. Employment loss as a result of COVID-19: a nationwide survey at the onset of COVID-19 in US LGBTQ+ populations. *Sex Res Social Policy*. 2022;19:1855–1866.
22. Wickersham JA, Meyer JP, Shenoi S, et al. Willingness to Be vaccinated against COVID-19 among people with HIV in the United States: results from a national survey. *Front Med (Lausanne)*. 2022;9:886936.
23. Centers for Disease Control and Prevention. *Medical Monitoring Project (MMP)*. Published May 28, 2020. Available at: https://www.cdc.gov/hiv/statistics/systems/mmp/index.html. Accessed August 17, 2020.
24. *Distinguishing Public Health Research and Public Health Nonresearch. Policy 557*. Center for Disease Control and Prevention; 2010. Available at: https://www.cdc.gov/os/integrity/docs/cdc-policy-distinguishing-public-health-research-nonresearch.pdf. Accessed December 2, 2022.
25. New York State Department of Health. *Positive Tests Over Time, by Region and County*. Published online November 3, 2023. Available at: https://coronavirus.health.ny.gov/positive-tests-over-time-region-and-county. Accessed November 6, 2023.
26. Overton ET, Weir IR, Zanni MV, et al. Asymptomatic SARS-CoV-2 infection is common among ART-Treated people with HIV. *J Acquir Immune Defic Syndr*. 2022;90:377–381.
27. Parker K, Minkin R, Bennett J. *Economic Fallout from COVID-19 Continues to Hit Lower-Income Americans the Hardest*. Pew Research Center; 2020. Available at: https://www.pewresearch.org/social-trends/2020/09/24/economic-fallout-from-covid-19-continues-to-hit-lower-income-americans-the-hardest/. Accessed February 24, 2023.
28. Tran BX, Ho RCM, Ho CSH, et al. Depression among patients with HIV/AIDS: research Development and effective Interventions (GAPRESEARCH). *Int J Environ Res Public Health*. 2019;16:1772.
29. Wood BR, Lan KF, Tao Y, et al. Visit trends and factors associated with telemedicine uptake among persons with HIV during the COVID-19 pandemic. *Open Forum Infect Dis*. 2021;8:ofab480.
30. Labisi T, Regan N, Davis P, et al. HIV care meets telehealth: a review of successes, disparities, and unresolved challenges. *Curr HIV/AIDS Rep*. 2022;19:446–453.
31. Auchus IC, Jaradeh K, Tang A, et al. Transitioning to telehealth during the COVID-19 pandemic: patient perspectives and attendance at an HIV clinic in San Francisco. *AIDS Patient Care STDS*. 2021;35:249–254.
32. Brown LB, Spinelli MA, Gandhi M. The interplay between HIV and COVID-19: summary of the data and responses to date. *Curr Opin HIV AIDS*. 2021;16:63–73.
33. *COVID Data Tracker*. Center for Disease Control and Prevention. Available at: https://covid.cdc.gov/covid-data-tracker/#vaccinations_vacc-people-booster-percent-total. Accessed January 15, 2023.
34. Kaida A, Brotto LA, Murray MCM, et al. Intention to receive a COVID-19 vaccine by HIV status among a population-based sample of women and gender diverse individuals in British Columbia, Canada. *AIDS Behav*. 2022;26:2242–2255.
35. Menza TW, Capizzi J, Zlot AI, et al. COVID-19 vaccine uptake among people living with HIV. *AIDS Behav*. 2022;26:2224–2228.
36. Fulda ES, Fitch KV, Overton ET, et al. COVID-19 vaccination rates in a global HIV cohort. *J Infect Dis*. 2022;225:603–607.
37. Ssentongo P, Heilbrunn ES, Ssentongo AE, et al. Epidemiology and outcomes of COVID-19 in HIV-infected individuals: a systematic review and meta-analysis. *Sci Rep*. 2021;11:6283.
38. Centers for Disease Control and Prevention. *HIV Surveillance Report, 2018 (Updated)*; 2019. Available at: http://www.cdc.gov/hiv/library/reports/hiv-surveillance.html. Accessed June 1, 2020.
39. Liang CK, Lee WJ, Peng LN, et al. COVID-19 vaccines in older adults: challenges in vaccine development and policy making. *Clin Geriatr Med*. 2022;38:605–620.