Received: 25 January 2024 | Accepted: 14 March 2024

DOI: 10.1111/hiv.13640

SHORT COMMUNICATION

HIV outcomes during the COVID-19 pandemic in people of Black ethnicities living with HIV in England

Zoe Ottaway[1,2] | **Lucy Campbell**[1,2] | **Julie Fox**[2,3] | **Fiona Burns**[4,5] | **Lisa Hamzah**[6] | **Stephen Kegg**[7] | **Melanie Rosenvinge**[7] | **Sarah Schoeman**[8] | **David Price**[9] | **Rachael Jones**[10] | **Robert F. Miller**[5,11] | **Shema Tariq**[5,11] | **Frank A. Post**[1,2]

[1]King's College Hospital NHS Foundation Trust, London, UK

[2]King's College London, London, UK

[3]Guys and St Thomas's NHS Foundation Trust, London, UK

[4]Royal Free London NHS Foundation Trust, London, UK

[5]Institute for Global Health, University College London, London, UK

[6]St Georges University Hospital NHS Foundation Trust, London, UK

[7]Lewisham and Greenwich NHS Trust, London, UK

[8]Leeds Teaching Hospitals NHS Trust, Leeds, UK

[9]Newcastle Hospitals NHS Foundation Trust, Newcastle, UK

[10]Chelsea and Westminster NHS Foundation Trust, London, UK

[11]Central and North West London Foundation Trust, London, UK

Correspondence
Zoe Ottaway, School of Immunology and Microbial Sciences, King's College London, Weston Education Centre (rm 2.50), Cutcombe Road, London SE5 9RJ, UK.
Email: zoe.ottaway@kcl.ac.uk

Funding information
Gilead Sciences, Grant/Award Number: IN-UK-983-6053

Abstract

Objectives: To describe HIV care outcomes in people of Black ethnicities living in England during the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2; coronavirus disease 2019 [COVID-19]) pandemic.

Methods: This was an observational cohort study of people of self-reported Black ethnicities attending for HIV care at nine HIV clinics across England. The primary outcome was a composite of antiretroviral therapy (ART) interruption and HIV viraemia (HIV RNA ≥200 copies/mL) ascertained via self-completed questionnaires and review of medical records. We used multivariable logistic regression to explore associations between ART interruption/HIV viraemia and demographic factors, pre-pandemic HIV immunovirological control, comorbidity status, and COVID-19 disease and vaccination status.

Results: We included 2290 people (median age 49.3 years; 56% female; median CD4 cell count 555 cells/mm^3; 92% pre-pandemic HIV RNA <200 copies/mL), of whom 302 (13%) reported one or more ART interruption, 312 (14%) had documented HIV viraemia ≥200 copies/mL, and 401 (18%) experienced the composite endpoint of ART interruption/HIV viraemia. In multivariable analysis, a pre-pandemic HIV RNA <200 copies/mL (odds ratio [OR] 0.21; 95% confidence interval [CI] 0.15–0.30) and being vaccinated against SARS-CoV-2 (OR 0.41; 95% CI 0.30–0.55) were associated with reduced odds of ART interruption/HIV viraemia; pandemic-related disruptions to HIV care were common self-reported additional factors.

Conclusions: During the COVID-19 pandemic, one in six people of Black ethnicities in this HIV cohort experienced an ART interruption/HIV viraemia. Some of these episodes resulted from pandemic-related healthcare disruptions. Associations with suboptimal engagement in HIV care pre-pandemic and not being vaccinated against SARS-CoV-2 suggest that wider health beliefs and/or poor healthcare access may have been contributory factors.

KEYWORDS
antiretroviral therapy, black, COVID-19, engagement, HIV

INTRODUCTION

The World Health Organization declared severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2; coronavirus disease 2019 [COVID-19]) a pandemic on 11 March 2020, resulting in the introduction of substantial public health prevention measures. In the UK, by late March 2020, the Government had introduced legally enforced 'stay-at-home' orders and 'shielding' for those deemed extremely clinically vulnerable, which initially included people with HIV [1]. The pandemic caused widespread disruption to healthcare services because of COVID-related hospitalizations and interruption of delivery of non-emergency services, including HIV care and in-person provision of antiretroviral therapy (ART) [2]. Data on the impact of the COVID-19 pandemic on HIV care outcomes are mixed. Some studies suggest that the pandemic increased rates of HIV viraemia while receiving ART, morbidity, and mortality [3–5]; others have shown no substantial impact on virological control [6]. However, little is known about the impact of the COVID-19 pandemic on HIV care outcomes in people of Black ethnicities in England, communities that experience multiple and intersecting disadvantages and poorer health outcomes [7–9].

The COVID-AFRICA study explored how these communities were affected by the COVID-19 pandemic. Here, we report HIV care outcomes during the COVID-19 pandemic.

METHODS

Study population

Data were obtained from the GEN-AFRICA (Genetic Determinants of Kidney Disease in People of African Ancestry with HIV; NCT05685810) cohort, which was established between May 2018 and January 2020; participation in GEN-AFRICA was open to all adults of self-reported Black ethnicities receiving HIV care in England who were able and willing to provide informed consent, demographic and clinical data, and a blood and urine sample for research. GEN-AFRICA participants who remained in HIV care on 1 January 2020 were eligible for inclusion in the COVID-AFRICA study. Between June 2021 and November 2022, individuals attending HIV clinics who provided written informed consent were asked to complete questionnaires on HIV care, COVID-19 illnesses, and SARS-CoV-2 vaccination. For those not enrolled during HIV care visits, we obtained peak HIV RNA, COVID-19 infection status, SARS-CoV-2 vaccination, and vital status from medical records between July and November 2022. The study was approved by a national health service research ethics committee (21/ES/0047) and the Health Research Authority (IRAS 294887).

Exposure variables

The following data were obtained from the GEN-AFRICA study visit (median date of enrolment March 2019): region of ancestry, year of HIV diagnosis, prior AIDS diagnoses, nadir CD4 cell count, and most recent (pre-pandemic) CD4 cell count, HIV RNA, and comorbid conditions [10]. COVID-19 disease (illnesses consistent with COVID-19 after 1 January 2020, irrespective of diagnostic test result) and SARS-CoV-2 vaccination status (one or more dose) were ascertained through questionnaires and review of medical records.

Outcomes

Our composite outcome comprised any ART interruption and/or HIV RNA ≥200 copies/mL between January 2020 and November 2022. Questionnaires were used to ascertain whether participants had run out of or stopped their ART and whether their viral load had remained undetectable or become detectable at any stage during the pandemic, with the option to provide reasons if it had. Sites were asked to report any known ART interruptions, the highest viral load measurement after 1 January 2020, and – for those with the composite outcome – the most recent viral load.

Statistical analyses

Statistical analyses were restricted to the nine clinics that provided HIV outcomes for at least 80% of GEN-AFRICA participants. Baseline (pre-pandemic) characteristics of the study population, and their COVID-19 disease and SARS-CoV-2 vaccination status, were evaluated in those who experienced an ART interruption/HIV viraemia

compared with those whose HIV remained supressed (HIV RNA <200 copies/mL) throughout, using Pearson's χ^2 test for categorical variables and two-sample Wilcoxon rank-sum (Mann–Whitney) test for comparing the median values of continuous variables. Multivariable logistic regression was used to investigate associations between baseline characteristics and pandemic ART interruption/HIV viraemia. Factors associated ($p < 0.1$) in univariable analysis were included in the multivariable models. All analyses were performed using STATA v17 (StataCorp, College Station, TX, USA).

RESULTS

Of the 2397 GEN-AFRICA participants considered for participation in COVID-AFRICA, 2312 (97%) were included, of whom 801 provided questionnaire data. The current analyses were restricted to the 2290 (99%) individuals for whom ART interruption/HIV viraemia could be evaluated (Figure S1). At the start of the pandemic, the median age of participants was 49.3 (interquartile range [IQR] 42.7–55.7) years; 56% were female, and most were of sub-Saharan African ancestry, had long-standing (median 14 years) and well-controlled HIV (median CD4 cell count 555 cells/mm^3, 92% HIV RNA <200 copies/mL) (Table 1). Between January 2020 and November 2022, 518 (30%) participants had experienced one or more episode of COVID-19, of which 314 (61%) were confirmed by diagnostic tests, and 1763 (87%) had received one or more dose of SARS-CoV-2 vaccine.

During the study period, 302 (13%) participants reported one or more ART interruption, and 312 (14%) had documented HIV viraemia ≥200 copies/mL; 241 (80%) of those reporting an ART interruption and 237 (76%) of those with documented HIV viraemia during the pandemic had undetectable viral loads at baseline. In total, 401 (18%) participants experienced the composite outcome (ART interruption /HIV viraemia). Of these, 213 (53%) had an ART interruption with confirmed viraemia, 99 (25%) had viraemia only, and 89 (22%) had an ART interruption that was not accompanied by HIV RNA testing or documented viraemia. The median viral load in those with documented HIV viraemia was 3981 (IQR 693–47 863) copies/mL. Of the 2130 participants with HIV RNA <200 copies/mL at baseline, 316 (15%) experienced ART interruption/HIV viraemia.

Participants who experienced ART interruption/HIV viraemia were younger, less likely to be of East African ancestry, and more recently diagnosed with HIV and had lower pre-pandemic CD4 cell counts and rates of HIV suppression (Table 1). They were also less likely to have received SARS-CoV-2 vaccination. In univariable analysis, being older, being of East African ancestry, having been diagnosed with HIV for longer, having a higher recent CD4 cell count, having pre-pandemic HIV RNA <200 copies/mL, and having received one or more dose of SARS-CoV-2 vaccine were all associated with reduced odds of ART interruption/HIV viraemia during the COVID-19 pandemic. In the adjusted analysis, a pre-pandemic HIV RNA <200 copies/mL and having received one or more dose of SARS-CoV-2 vaccine remained strongly associated with ART interruption/HIV viraemia; however, age and recent CD4 cell count >350 cells/mm^3 were no longer statistically significant (Table 2).

In total, 52 participants who reported ART interruption/HIV viraemia provided reasons for this (Figure S2): 20 (39%) cited logistical barriers such as changes to clinic appointments, pharmacy and home delivery service disruptions, or pandemic restrictions on leaving the house, and 14 (27%) had travelled abroad, where they had run out of ART. Other reasons included low mood, changes to daily routine brought about by the government-imposed pandemic restrictions, and personal choice.

Post-pandemic vital status/viral load data were available for 392 (98%) of the 401 participants who experienced ART interruption/HIV viraemia: 288 (74%) had HIV RNA <200 copies/mL at their most recent clinic visit, whereas 43 (11%) were not in care and eight (2%) had died.

DISCUSSION

One in six people of Black ethnicities living with HIV in this cohort experienced ART interruption/HIV viraemia between January 2020 and November 2022. Non-suppression of HIV RNA before the pandemic and not having received SARS-CoV-2 vaccination were the factors most strongly associated with ART interruption/HIV viraemia; participants additionally cited COVID-19-related disruptions to HIV care and more widely in their daily lives as important factors.

Most studies have reported little impact of the COVID-19 pandemic on HIV care outcomes. A systematic review found that, although few studies reported on viral suppression during the pandemic, most reported no significant differences before and during the pandemic [6, 11–14], apart from a study from San Francisco, which reported 31% increased odds of viral non-suppression in April 2020 compared with December 2019–February 2020; participants of Black ethnicity were disproportionally affected (adjusted OR 1.60; 95% confidence interval 1.33–1.91) [4]. A Spanish study reported a 37% increase in loss-to-follow-up during 2020 compared with 2006–2019 [15].

Our data suggest that HIV clinics were unable to fully mitigate the impact of pandemic disruptions on HIV care

TABLE 1 Baseline and pandemic characteristics of study participants stratified by the outcome of interruption of antiretroviral therapy and/or HIV viraemia during the study period.

Participant characteristics	Total $N = 2290$	No ART interruption/ HIV viraemia[g] $N = 1889$	ART interruption/HIV viraemia[g] $N = 401$	p value
Demographic parameters				
Age, years	49.3 (42.7–55.7)	49.6 (43.2–55.9)	47.8 (40.0–54.4)	<0.001
Sex, female	1276 (56.0)	1064 (56.5)	212 (53.4)	0.25
Region of ancestry[a]				0.004
West Africa	755 (33.0)	619 (32.8)	136 (34.0)	
East Africa	449 (19.7)	391 (20.7)	58 (14.5)	
Southern/Central Africa	616 (27.0)	504 (26.7)	112 (28.0)	
Caribbean	310 (13.6)	257 (13.6)	53 (13.3)	
Other/unknown	155 (6.8)	114 (6.1)	41 (10.3)	
HIV status				
Time since HIV diagnosis, years	14 (9–18)	14 (9–18)	13 (8–18)	0.008
Prior AIDS diagnosis	485 (22.1)	400 (22.1)	85 (22.1)	0.99
Nadir CD4 cell count, cells/mm^3	205 (81–336)	206 (82–338)	201 (74–324)	0.69
Recent CD4 cell count, cells/mm^3	555 (399–729)	567 (414–739)	502 (305–691)	<0.001
HIV RNA < 200 copies/mL	2109 (92.4)	1793 (95.2)	316 (79.0)	<0.001
Comorbid status				
Obesity[b]	908 (40.8)	760 (41.3)	148 (38.2)	0.26
Hypertension	726 (31.9)	604 (32.1)	122 (30.7)	0.57
Diabetes	214 (9.5)	175 (9.4)	39 (9.9)	0.75
Kidney disease[c]	148 (6.5)	124 (6.6)	24 (6.0)	0.68
Cardiovascular disease[d]	97 (4.3)	80 (4.3)	17 (4.3)	0.99
Pandemic parameters				
COVID-19 (any severity)[e]	518 (30.4)	437 (30.4)	81 (30.2)	0.96
SARS-CoV-2 vaccination[f]	1763 (87.2)	1514 (89.3)	249 (76.2)	<0.001

Note: Age and time since HIV diagnosis are calculated to reflect status on 1 January 2020; other components of HIV and comorbid status reflect pre-pandemic status.

Data are presented as N (%) or median (interquartile range) unless otherwise indicated.

Abbreviation: ART, antiretroviral therapy.

[a]Region of ancestry = based on country of birth of both parents; regions of sub-Saharan African ancestry (East, Southern, Central and West Africa) as defined by the African Union. Participants whose parents' country of birth was unknown, of different African regions, or outside sub-Saharan Africa or the Caribbean, and those of mixed African/Caribbean ancestry were grouped together as 'Other'.

[b]Obesity = body mass index ≥30 kg/m^2.

[c]Kidney disease = estimated glomerular filtration rate <60 mL/min/1.73m^2.

[d]Cardiovascular disease = myocardial infarction, coronary artery disease, peripheral vascular disease, stroke, heart failure, and/or cardiomyopathy.

[e]COVID-19 = illnesses consistent with COVID-19 after 1 January 2020, irrespective of pathological confirmation.

[f]SARS-CoV-2 vaccination = having received one or more doses of any SARS-CoV-2 vaccine.

[g]HIV viraemia refers to a documented HIV RNA >200 copies/mL during the pandemic (January 2020–November 2022).

outcomes among people of Black ethnicities in England. Limited digital health literacy and competing health needs may have worsened existing health inequities in these populations [4, 5, 16]. Reassuringly, most (74%) of those who experienced viral non-suppression during the pandemic subsequently re-suppressed on ART. However, this highlights the importance of understanding the reasons for continued viral non-suppression in those whose HIV viral loads remained detectable following return to more regular models of HIV service delivery, and for providing tailored support.

We found an association between ART interruption/HIV viraemia and not having received SARS-CoV-2 vaccination. Uptake of and adherence to ART is influenced by

TABLE 2 Associations between demographic, clinical, immunovirological parameters and antiretroviral therapy interruption/HIV viraemia.

		Univariable		Multivariable	
Parameter		**OR (95% CI)**	***p* value**	**OR (95% CI)**	***p* value**
Age, years	20–29	1		1	
	30–39	0.57 (0.32–1.00)	0.05	0.61 (0.31–1.19)	0.15
	40–49	0.36 (0.22–0.61)	<0.001	0.54 (0.29–0.99)	0.05
	50–59	0.37 (0.22–0.62)	<0.001	0.56 (0.31–1.02)	0.06
	≥60	0.31 (0.18–0.54)	<0.001	0.53 (0.28–1.01)	0.05
Sex	Male (vs. female)	0.88 (0.71–1.09)	0.25		
Region of ancestry[a]	West Africa	1		1	
	East Africa	0.68 (0.48–0.94)	0.02	0.68 (0.46–1.00)	0.05
	Southern/Central Africa	1.01 (0.77–1.33)	0.94	0.94 (0.68–1.30)	0.73
	Caribbean	0.94 (0.66–1.33)	0.72	0.88 (0.59–1.31)	0.52
	Other/unknown	1.64 (1.09–2.45)	0.02	1.31 (0.80–2.14)	0.28
Time since HIV diagnosis	Per additional year	0.98 (0.96–1.00)	0.02	1.00 (0.98–1.02)	0.87
Prior AIDS	Yes (vs. no)	1.00 (0.77–1.31)	0.99		
Nadir CD4 cell count, cells/mm^3	<200 (vs. ≥200)	1.02 (0.82–1.27)	0.86		
Recent CD4 cell count, cells/mm^3	≥350 (vs. <350)	0.70 (0.55–0.88)	0.002	0.83 (0.63–1.09)	0.17
Pre-pandemic HIV RNA, copies/mL	<200 (vs. ≥200)	0.19 (0.14–0.26)	<0.001	0.21 (0.15–0.30)	<0.001
Obesity[b]	Yes (vs. no)	0.88 (0.70–1.10)	0.26		
Hypertension	Yes (vs. no)	0.94 (0.74–1.18)	0.57		
Diabetes	Yes (vs. no)	1.06 (0.74–1.53)	0.75		
Kidney disease[c]	Yes (vs. no)	0.91 (0.58–1.43)	0.68		
Cardiovascular disease[d]	Yes (vs. no)	1.00 (0.59–1.71)	0.99		
COVID-19 (any severity)[e]	Yes (vs. no)	0.99 (0.75–1.32)	0.96		
COVID-19 vaccination[f]	Yes (vs. no)	0.38 (0.28–0.51)	<0.001	0.41 (0.30–0.55)	<0.001

Note: HIV viraemia defined as HIV RNA >200 copies/mL during the pandemic (January 2020–November 2022).

Abbreviations: CI, confidence interval; OR, odds ratio.

[a]Region of ancestry = Based on country of birth of both parents; regions of sub-Saharan African ancestry (East, Southern, Central and West Africa) as defined by the African Union. Participants whose parents' country of birth was unknown, of different African regions or outside sub-Saharan Africa or the Caribbean, and those of mixed African/Caribbean ancestry were grouped together as 'Other'.

[b]Obesity = body mass index ≥30 kg/m^2.

[c]Kidney disease = estimated glomerular filtration rate <60 mL/min/1.73m^2.

[d]Cardiovascular disease = myocardial infarction, coronary artery disease, peripheral vascular disease, stroke, heart failure, and/or cardiomyopathy.

[e]COVID-19 = illnesses consistent with COVID-19 after 1 January 2020, irrespective of pathological confirmation.

[f]COVID-19 vaccination = having received one or more SARS-CoV-2 vaccination.

implicit judgements of personal need for the treatment (necessity beliefs) and concerns about the potential adverse consequences of taking it [17]. For some of our participants, ART interruptions may have been intentional. Previously reported perceptual barriers to taking ART among people of Black ethnicities in the UK include doubts about the necessity of ART, stemming from feeling well, a belief that treatment is futile because it does not cure HIV, and religious beliefs. Concerns about ART include fears about side effects, accidental disclosure of HIV status, and stigma associated with attending HIV services [18]. The Necessity-Concerns Framework similarly applies to SARS-CoV-2 vaccines: COVID-AFRICA participants who remained unvaccinated had lower vaccination-necessity and higher vaccination-concerns scores [19]. The relationship between ART interruptions, non-uptake of SARS-CoV-2 vaccines, wider health beliefs, and pandemic lived experiences among these communities deserves further study. However, it is important to also acknowledge that not receiving SARS-CoV-2 vaccination may result from broader barriers to healthcare access (e.g., competing priorities, hard-to-access services, and

experiences of racism and discrimination within healthcare systems), which could also affect access to ART.

The strengths of our study include the availability of an established, well-characterized cohort, use of both self-reported ART interruptions and clinic virological measurements to define our composite outcome, and near complete data on HIV viral load before the pandemic and – for those with ART interruption/HIV viraemia – at their most recent clinic visit in 2023. Selection bias was mitigated by including participants through active enrolment as well as review of medical records of those who were unable to provide informed consent. However, self-reported ART interruptions and the reasons for these were not available for all participants and may have been under-reported or subject to recall bias. The duration of ART interruption was not captured, and not all ART interruptions were accompanied by measurements of HIV RNA. Furthermore, previous participation in the GEN-AFRICA study may reflect more stable engagement in HIV care; rates of ART interruption/HIV viraemia may have been higher in other people of Black ethnicities with HIV.

In summary, we identified that both pre-pandemic uptake and adherence to ART and having received SARS-CoV-2 vaccines were associated with ART interruption/HIV viraemia in people of Black ethnicities in England. The COVID-19 pandemic and subsequent public health prevention measures are likely to have amplified existing health inequalities and posed additional challenges in achieving and sustaining HIV viral suppression in these populations. This may have not only potentially affected individual morbidity and mortality risk but also increased the risk of sexual transmission of HIV. Our forthcoming qualitative analyses will allow us to better understand the reasons underlying ART interruption and adherence challenges during the pandemic. Ultimately, identifying and supporting those most at risk of disengaging from HIV care is of high public health importance and a key component of pandemic preparedness and resilience within HIV clinical care.

AUTHOR CONTRIBUTIONS

The study was designed by ZO, FAP, and LC. FAP, JF, FB, LH, SK, MR, SS, DP, and RJ were site principal investigators. FAP, JF, FB, LH, SK, MR, SS, DP, and RJ coordinated recruitment and data collection at their sites. LC assisted with logistic and governance aspects. ZO performed the analyses with input from FAP and LC. ZO, FAP, LC. RFM interpreted the findings. ZO wrote the first draft of the manuscript with input from FAP. All authors revised and approved the final version of the manuscript.

ACKNOWLEDGEMENTS

The authors thank the study participants, participating sites, and all members of the COVID-AFRICA study group (Appendix A).

FUNDING INFORMATION

The COVID-AFRICA study was funded through a grant from Gilead Sciences (IN-UK-983-6053).

CONFLICT OF INTEREST STATEMENT

ZO, LC, JF, FB, LH, SK, MR, SS, DP, RJ, ST, and RFM declare no competing interests. FAP has received grants, personal fees, and non-financial support from Gilead, ViiV, and MSD during the conduct of the study.

DATA AVAILABILITY STATEMENT

The database contains personal and sensitive information and is therefore not publicly available. Access to the study data and/or samples is governed by the National Health Service data access policy and those of King's College Hospital NHS Foundation Trust, the study sponsor. The Gen-AFRICA and COVID-AFRICA studies are open to collaborations, and all requests from researchers who meet the criteria for access to fully anonymized patient-level data will be considered. Concepts can be submitted for review to the principal investigator (Prof. Frank Post; email: frank.post@kcl.ac.uk).

ETHICS STATEMENT

The study was approved by the local research ethics committee (21/ES/0047) and the Health Research Authority (IRAS 294887).

ORCID

Zoe Ottaway https://orcid.org/0009-0008-9425-7662
Shema Tariq https://orcid.org/0000-0001-9802-7727
Frank A. Post https://orcid.org/0000-0002-2844-1612

REFERENCES

1. COVID-19 & shielding: advice for HIV clinicians, GPs and people living with HIV. 2020 [cited July 10, 2023]. Available from: https://www.bhiva.org/COVID-19-and-shielding-advice-for-HIV-clinicians-GPs-and-people-living-with-HIV
2. Impact of the COVID-19 Pandemic. Report|AAE. 2020 [cited July 25, 2023]. Available from: https://www.aidsactioneurope.org/en/publication/impact-covid-19-pandemic-report
3. Hogan AB, Jewell BL, Sherrard-Smith E, et al. Potential impact of the COVID-19 pandemic on HIV, tuberculosis, and malaria in low-income and middle-income countries: a modelling study. *Lancet Glob Health*. 2020;8(9):e1132-e1141.
4. Spinelli MA, Hickey MD, Glidden DV, et al. Viral suppression rates in a safety-net HIV clinic in San Francisco destabilized during COVID-19. *Aids*. 2020;34(15):2328-2331.

5. Baral S, Rao A, Rwema JOT, et al. Competing health risks associated with the COVID-19 pandemic and early response: a scoping review. *PLoS One*. 2022;17(8):e0273389. doi:10.1371/journal.pone.0273389
6. Cassim N, Hans L, Venter WDF, Somayya S, Da Silva P, Stevens WS. National impact of SARS-CoV-2 infection on HIV virological suppression in South Africa. *J Acquir Immune Defic Syndr*. 2023;94(5):381-386. https://journals.lww.com/jaids/fulltext/2023/12150/national_impact_of_sars_cov_2_infection_on_hiv.1.aspx
7. Apea VJ, Wan YI, Dhairyawan R, et al. Ethnicity and outcomes in patients hospitalised with COVID-19 infection in East London: an observational cohort study. *BMJ Open*. 2021;11(1):e042140.
8. Bhaskaran K, Rentsch CT, MacKenna B, et al. HIV infection and COVID-19 death: a population-based cohort analysis of UK primary care data and linked national death registrations within the OpenSAFELY platform. *Lancet HIV*. 2021;8(1):e24-e32.
9. Egede LE, Walker RJ. Structural racism, social risk factors, and Covid-19-a dangerous convergence for black Americans HHS public access. *N Engl J Med*. 2020;383(12):77.
10. Hung RKY, Santana-Suarez B, Binns-Roemer E, et al. The epidemiology of kidney disease in people of African ancestry with HIV in the UK. *EClinicalMedicine*. 2021;1:38.
11. McGinnis KA, Skanderson M, Justice AC, et al. HIV care using differentiated service delivery during the COVID-19 pandemic: a nationwide cohort study in the US Department of Veterans Affairs. *J Int AIDS Soc*. 2021;24(S6):e25810. doi:10.1002/jia2.25810
12. Meyer D, Slone SE, Ogungbe O, Duroseau B, Farley JE. 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;1(27):344-357. doi:10.1007/s10461-022-03771-w
13. Sorbera M, Fischetti B, Khaimova R, Niewinski M, Wen K. Evaluation of virologic suppression rates during the COVID-19 pandemic with outpatient interdisciplinary HIV care. *J Am Coll Clin Pharm*. 2021;4(8):964-968. https://pubmed.ncbi.nlm.nih.gov/34230911/
14. Rosas Cancio-Suárez M, Alonso C, Jesús Vivancos M, et al. Clinical medicine impact of COVID-19 on the care of patients with HIV infection. *J Clin Med*. 2023;12:3882.
15. Palacio-Vieira J, Moreno-Fornés S, Díaz Y, et al. Who is lost to follow-up in HIV care? Assessment of care retention over time and the impact of COVID-19. Longitudinal analysis of the PISCIS cohort. *HIV Med*. 2023;24(9):965-978. https://pubmed.ncbi.nlm.nih.gov/36990962/
16. Rick F, Odoke W, van den Hombergh J, Benzaken AS, Avelino-Silva VI. Impact of coronavirus disease (COVID-19) on HIV testing and care provision across four continents. *HIV Med*. 2022;23(2):169-177.
17. Horne R, Cooper V, Gellaitry G, Date HL, Fisher M. Patients' perceptions of highly active antiretroviral therapy in relation to treatment uptake and adherence: the utility of the necessity-concerns framework. *J Acquir Immune Defic Syndr*. 2007;45(3):334-341. https://pubmed.ncbi.nlm.nih.gov/17514019/
18. Glendinning E, Spiers J, Smith JA, et al. A qualitative study to identify perceptual barriers to antiretroviral therapy (ART) uptake and adherence in HIV positive people from UK black African and Caribbean communities on behalf of the SUPA Group. *AIDS Behav*. 2019;23:2514-2521. doi:10.1007/s10461-019-02670-x
19. Campbell L, Ottaway Z, Hung R, et al. Beliefs associated with COVID-19 vaccine uptake among people of black ethnicities living with HIV: the necessity concerns framework. *HIV Med*. 2022;23(S2):16-22.

SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

How to cite this article: Ottaway Z, Campbell L, Fox J, et al. HIV outcomes during the COVID-19 pandemic in people of Black ethnicities living with HIV in England. *HIV Med*. 2024;1-8. doi:10.1111/hiv.13640

APPENDIX A: COVID-AFRICA group: Study sites and staff

University Hospitals Sussex NHS Foundation Trust, Brighton: Amanda Clarke (PI), Marion Campbell, Alyson Knott, Lisa Barbour, Vittorio Trevitt.

Chelsea and Westminster NHS Foundation Trust, London: Rachael Jones (PI), Alex Schoolmeesters, Shoreh Ghazali.

Guys and St Thomas's NHS Foundation Trust, London: Julie Fox (PI), Anele Waters, Mariusz Racz, Louise Terry, Kathy Arbis.

King's College Hospital NHS Foundation Trust, London: Frank Post (CI and PI), Zoe Ottaway, Beatriz Santana-Suarez, Leigh McQueen, Lucy Campbell, Bee Barbini, Emily Wandolo, Rachel Hung, Luella Hanbury, Sarah Barber, Chris Taylor, Mary Poulton, Holly Middleditch, Itty Samuel, Candice McDonald, Vladimir Kolodin, Laura Cechin, Larissa Mulka, Amy John, Sally Hawkins, Madelaine Angus, Tim Appleby, Katherine Bainbridge, Hayley Cheetham, Julie Barker, Kate Childs, Rousell Roberts, Nivenjit Kaur, Lisa Shorrock, Kate El Bouzidi, Nisha Patel, Amelia Oliveira, Ayoma Ratnappuli, Kate Flanagan, Daniel Trotman, Nisha Mody, Michael Brady, Killian Quinn, Elizabeth Hamlyn, Gurjinder Sandhu, Verity Sullivan, Naomi Fitzgerald.

Leeds Teaching Hospitals NHS Trust, Leeds: Sarah Schoeman (PI), Gary Lamont, Natasha Calder-Smith, Tadas Mazeika, Kiran Chana.

North Manchester General Hospital, Manchester: Andrew Ustianowski (PI), Gabriella Lindergard, Jan Flaherty, Valerie George, Denise Kadiu, Alice Hendy, Kevin Kuriakose.

Mortimer Market Centre; Central and North West London NHS Foundation Trust, London: Sarah Pett (PI), Mah Jabeen Qamar, Jose Paredes Sosa, Konstantina Tetorou, Michelle Beynon, Adesola Yinka-Ogunleye, Gosala Gopalakrishnan, Irfaan Maan, Claire Mullender.

Newcastle Hospitals NHS Foundation Trust, Newcastle: David Ashley Price (PI), Bijal Patel, Ian McVittie.

Queen Elizabeth Hospital, Woolwich; Lewisham and Greenwich NHS Trust, London: Stephen Kegg (PI), Chloe Saad, Rosa Harrington, Kirsty Cunningham, Mandy Lewis.

Royal Free London NHS Foundation Trust, London: Fiona Burns (PI), Jonathan Edwards, Tom Fernandez, Qayo Egeh, Megan Bailey, Katie Spears.

St George's University Hospital NHS Foundation Trust, London: Lisa Hamzah (PI), Catherine Cosgrove, Hannah Laurence, Ameen Rahman, Katie Toler.

University Hospital Lewisham; Lewisham and Greenwich NHS Trust, London: Melanie Rosenvinge (PI), Claudia Adade, Shelley Campbell.

Africa Advocacy Foundation: Denis Onyango.