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A cross-sectional survey of healthcare workers' experiences and perceptions of the 2022 mpox outbreak in the United Kingdom

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Title

A cross-sectional survey of healthcare workers' experiences and perceptions of the 2022 mpox outbreak in the United Kingdom

Authors

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Abstract

Objective: To understand the experiences and perceptions of healthcare workers responding to the May 2022 mpox outbreak in the United Kingdom (UK).

Design: Cross-sectional, anonymous, online survey collecting quantitative and qualitative data. Convenience sample recruited via an international network of clinicians working on mpox and promoted through clinical associations and social media. Survey domains included mpox-related workload; preparedness, support, and training; safety at work; vaccination; and wellbeing. Qualitative descriptive analysis of free text responses was conducted to support interpretation of the quantitative data.

Participants: Participants who were employed as healthcare workers in the UK and had direct clinical experience of mpox were included in the analysis. The survey was completed between August and October 2022 by 145 UK healthcare workers, with most encountering mpox in sexual health clinics (89.0%) and HIV clinics (21.4%).

Results: The majority (70.8%) reported that they were required to respond to mpox in addition to their existing clinical responsibilities, with nearly half (47.6%) working longer hours as a result. Respondents noted that a lack of additional funding for mpox-related services combined with pre-existing pressures on sexual health services meant expectations around capacity to respond to mpox felt unrealistic and had negative implications for routine sexual health services. 68.3% of respondents reported experiencing some form of negative emotional impact due to their mpox work, with stress (59.3%), fatigue (44.1%) and anxiety (35.9%) being the most common symptoms. 35.0% stated that they were less likely to remain as a result of their experiences of the mpox outbreak.

Conclusions: With future infectious disease outbreaks an inevitability, these findings indicate that greater investment and coordination is required to ensure an effective national response and limit the negative impact on healthcare worker wellbeing.

Strengths and Limitations

Strengths

- This study is one of the first to explore the experiences of specialist UK healthcare workers responding to mpox, with data collected during the height of the outbreak.
- The collection of qualitative data via open-text questions helped to contextualise quantitative findings and centre healthcare workers' experiences and voices within the study.

Limitations

- The convenience sampling strategy means the respondents and perspectives presented in this study may not be representative of the wider UK sexual and reproductive health workforce.
- The exploratory nature of the study constrained statistical analysis, as it was underpowered to explore associations between variables.

Main text

BACKGROUND

There is increasing awareness of the pressures that pandemics and their system-wide management place on healthcare workers' physical, mental, and emotional health (2). The arrival of SARS-Cov-2 exposed multiple threats to healthcare worker wellbeing including fear of contagion (and subsequent transmission to others), exacerbated by a lack of adequate PPE, inadequate and rapidly changing guidance and training, and inconsistent information (3–5). Staff also faced higher workloads, disruptions to daily routines and team dynamics, negative impacts on personal and professional identity, and threats to psychological safety (3,6). Outside of work, healthcare workers also experienced stigma in the community (related to fear of contagion) and disruptions to family relationships (3,5).

May 2022 marked the beginning of what became the largest and geographically most widespread mpox (formerly monkeypox) outbreak to be reported outside the principal historically affected countries in western and central Africa. Within 3 months the outbreak was declared a Public Health Emergency of International Concern by the World Health Organization (7), coinciding with a time when health systems were already significantly overstretched by the ongoing COVID-19 pandemic (8).

Known risk factors for acquiring mpox include contact with fomites, bodily fluids, and airborne droplets (9–11), and the most evidenced and protective non-behavioural intervention is the smallpox vaccine (12,13). The latest outbreak, however, differed from previous outbreaks and presented new challenges. First, the timing of the outbreak coincided with the lifting of travel and other restrictions associated with the COVID-19 pandemic, with early cases linked to the re-commencing of large events, parties and increases in close social and sexual contact (14). Secondly, unlike previous outbreaks of mpox, transmission has been associated with sexual networks of gay or bisexual men and other men who have sex with men. Thirdly, clinical presentation has changed and now frequently includes anogenital lesions (15). These combined factors have put healthcare workers employed within sexual health services on the frontline of the response.

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3 In the UK, the unanticipated pressures of mpox were layered upon an already overstretched
4 and depleted sexual and reproductive health workforce. In addition to COVID-19-associated
5 disruption and burnout, sexual and reproductive health services were dealing with an ongoing
6 crisis in recruitment and retention of staff (16–18) coupled with reduced funding and rising
7 demand for services (19). Unlike most clinical services, sexual health services in England are
8 funded from highly constrained local authority public health budgets rather than from central
9 health system's funds in the National Health Service (NHS). As well as risking increased
10 transmission of mpox, clinical leaders noted that unexpected and unfunded mpox clinical
11 activity was competing with and displacing core sexual and reproductive health services,
12 threatening the sustainability of services and public health (20).

21
22 Given this context, mpox likely placed a significant burden on healthcare workers. However,
23 beyond data on exposure risks of mpox in health care settings (21,22), little is known so far
24 about the wider experience and impact of the outbreak on healthcare workers. We sought to
25 address this gap by conducting a rapid appraisal of the experiences and perceptions of UK
26 healthcare workers involved in the response to the 2022 multi-country mpox outbreak.

34 35 **METHODS**

36 Between August and October 2022, a cross-sectional, anonymous, online survey was
37 conducted with international healthcare professionals involved in the multi-country
38 outbreak of mpox. The survey contained 87 new (non-validated) questions, assessing:
39 individuals' knowledge and confidence around mpox diagnosis and management; their
40 views on outbreak preparedness, educational resources, workload, assessment of risk; and
41 how the outbreak affected them emotionally and psychologically. Both closed (single- and
42 multi-response questions) and open-text questions were used, as well as questions
43 regarding demographic characteristics (e.g. age, gender identity, sexual orientation, and
44 ethnicity). The survey was constructed using SmartSurvey software (SmartSurvey Ltd,
45 Tewkesbury, UK) (23) and disseminated in English, Spanish, French and Portuguese.

55 International survey dissemination was via SHARE-Net (24), an informal network of
56 researchers from the London-based Sexual Health and HIV All East Research Collaborative and
57 clinicians from around the world, as well as via newsletters and social media channels of the
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3 British Association for Sexual Health (BASHH), the British HIV Association (BHIVA), European
4 AIDS Clinical Society (EACS) and International AIDS Society (IAS).
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7 The analysis for this paper was restricted to respondents who reported working as a
8 healthcare professional residing in the UK, in order to better explore country- and context-
9 specific factors which influenced healthcare workers' experiences. A manuscript analysing
10 responses from the entire international sample is forthcoming.
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15 Quantitative data analysis was undertaken by MS using Stata 17 (StataCorp LLC, College
16 Station, TX, USA) (25) following a prespecified statistical analysis plan (available at
17 <https://osf.io/2bufh>). All authors provided iterative feedback. Denominators (n) are shown in
18 the text when missing responses occurred.
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23 The qualitative data collected expanded in free text boxes on specific questions (e.g., "How
24 satisfied were you with the support your clinic/service received from your national public
25 health agency? Why/why not?"). Qualitative data were analysed using descriptive qualitative
26 analysis (26) in NVivo v1.7 (Lumivero, Burlington, MA, USA) as a pragmatic approach to
27 handling large numbers of entries of short textual data. RH produced the coding categories
28 and brief findings under the question domains, with iterative feedback from remaining
29 authors. Respondent quotations are provided in each section to provide context to the
30 statistical findings.
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39 The study received ethical approval from the Queen Mary University of London Ethics of
40 Research Committee (QMERC22.297) and online informed consent was obtained from all
41 respondents at the beginning of the questionnaire. No patient and public involvement was
42 conducted as part of this study as the research was focused on the experiences of
43 healthcare staff. We conducted a separate project to understand the experiences of
44 communities affected by mpox which was co-produced with two community-based
45 organisations involved in sexual health promotion and advocacy (1).
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52 **RESULTS**

53 **Participant characteristics**

54 A total of 145 UK-based respondents completed the survey; their demographics are
55 presented in Table 1. Most were doctors (73.8%) or nurses (24.8%). All respondents had been
56 involved clinically (i.e. diagnosing and treating) with people with mpox. The main sites of care
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for patients with mpox were sexual health clinics (89.0%), specialist HIV clinics (21.4%), inpatient wards (12.4%), and emergency departments (8.3%). Most respondents identified as women (70.3%), 25.5% identified as men (one of whom identified as a trans man), 1.4% identified as non-binary, and 2.1% of respondents preferred not to say. 13.8% of respondents identified as a gay or bisexual man, making up approximately half of the male respondents.

Table 1. Survey respondent characteristics (n=145)

Category	n	%
Age		
18-25	1	0.7
26-30	12	8.3
31-34	15	10.3
35-40	19	13.1
41-50	49	33.8
51-60	39	26.9
60+	10	6.9
Gender		
Women	102	70.3
Men	38	26.2
Non-binary	2	1.4
Prefer not to say	3	2.1
Do you identify as a gay or bisexual man?		
Yes	20	13.8
No	122	84.1
Prefer not to say	3	2.1
Ethnicity		
White	115	79.3
Black	3	2.1
Asian	13	9.0
Latino / Latinx	1	0.7
Arab	1	0.7
Mixed or multiple ethnic groups	10	6.9
Prefer not to say	2	1.4
Professional role		
Doctor	107	73.8
Nurse	36	24.8
Health Promotion Worker	2	1.4
Where did you see suspected or confirmed clinical cases of monkeypox?		
Sexual health clinic (community, public, private)	130	89.0
Infectious disease clinic	4	2.8
Emergency department	12	8.3
HIV clinic	31	21.4

Dermatology clinic	1	0.7
General practice	1	0.7
In-patient ward	18	12.4

Mpox-related workload

During the first four weeks of the UK mpox outbreak, over one third of respondents (34.0%) reported that at least quarter of their working time was taken up with mpox and 19.0% reported that more than half of their time was mpox-focused. The majority (70.8%) reported that their other existing clinical responsibilities had not been removed to allow them to focus on mpox-related work, with nearly half (47.6%) working longer hours as a result of mpox.

Respondents carried out a range of tasks as part of their mpox-related clinical work, most commonly direct patient care (97.2%), contacting mpox patients or their contacts (74.5%), and developing local protocols and operational guidance (59.1%).

Four themes were identified in the open-text data in relation to mpox-related workload: a lack of additional funding or resources, existing pressures on services, unrealistic expectations around capacity to respond to mpox, and the implications for other sexual health services.

Many respondents noted that the increased workload associated with mpox was not matched by additional funding or resources, with some describing a sense that mpox was being 'dumped' on sexual health services. Respondents had to work additional hours as a result and felt there was little recognition for this (including no financial reimbursement for overtime).

"Expected to do a lot at speed with no additional support or resource."

Respondent 12 – Sexual Health and HIV doctor

Others highlighted that understaffing due to COVID-19, along with previous budgetary cuts, meant that these additional responsibilities were being assigned to services already under extreme pressure.

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3 *“I think even before covid the pressure within sexual health was such that it felt like you had*
4 *to rush through patients and didn't have the time to give the care that was needed)”*

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8 *Respondent 10 – Nurse or Nurse Practitioner*

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10 Reporting requirements to the national public health agency, the UK Health Security Agency
11 (UKHSA), added significant pressure. Some respondents felt that UKSHA's expectations of
12 how sexual health services should respond to the outbreak were unrealistic.
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16 *“There was a significant mismatch between the resources we had and the resources we were*
17 *expected to devote to the UKHSA processes (reporting cases, reporting on case*
18 *management, patient follow-ups, attendance at meetings, infection control)”*

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22 *Respondent 78 – Sexual Health and HIV doctor*

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24 Respondents attributed this to a lack of understanding about the reality of sexual health
25 services such as staffing levels, the logistics of applying guidance designed for highly
26 controlled in-patient settings (where rare cases of mpox were previously dealt with) to
27 open-access clinics, and having the infrastructure in place for services such as 24-hour on
28 call rota.
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34 Several respondents were concerned about the impact on other sexual health services.

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37 *“We have had acutely unwell patients EG: Herpes, PID [Pelvic Inflammatory Disease] care*
38 *unacceptably delayed by the need to phone triage and prioritise monkey pox testing.”*

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42 *Respondent 25 – Sexual Health and HIV doctor*

43 44 **Preparedness, support, and training**

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46 When asked how personally prepared they were for the mpox outbreak, more than three-
47 quarters (79.3%) of respondents said they were not at all or only slightly prepared (see Figure
48 1). Over half (51.7%) of respondents had never heard of mpox prior to the outbreak.
49 Respondents expressed a marked lack of confidence about their ability to care for people with
50 mpox. Over half (56.6%) of respondents described themselves as not at all confident at the
51 start of the outbreak, with 31.0% suggesting they had initially misdiagnosed a mpox-related
52 rash.
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3 **Figure 1. Perceptions of personal preparedness for mpox outbreak among survey**
4 **respondents (n=145)**
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7 *[Insert Figure 1 here]*
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12 However, 78.6% had received education, training, or instruction about mpox specifically.
13 Most commonly this was in the form of written guidance (61.4%), in-house practice education
14 (55.2%), practical PPE instruction (33.8%), and lectures, webinars, or presentations (32.4%).
15 Of those who had received mpox-related training or education and rated it (n=113), 11.5%
16 rated this entirely adequate, 79.6% rated it fairly or mostly adequate, and 8.9% rated it only
17 slightly or not at all adequate. Less than one third (29.0%) of respondents had completed any
18 type of general infectious disease outbreak management education and training.
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26 Over half (63.4%) of all respondents agreed or strongly agreed that their employing institution
27 had provided clear, timely and authoritative information about mpox. When asked how
28 satisfied they were with the support their clinic or service received from the national public
29 health agency (n=142), 62.6% said they were fairly, mostly or extremely satisfied, and 37.3%
30 said they were only slightly or not at all satisfied.
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36 In the open text data, those who were satisfied with the response were understanding that
37 the novelty of the outbreak meant that the public health agency lacked information about
38 how best to respond, and guidance changed as understanding increased. Others said they felt
39 the public health agency worked well with professional clinical bodies, and that the
40 information and training provided was excellent.
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46 *“UKHSA's knowledge of the infection (which was unavoidably not based on any previous*
47 *outbreak as sexually transmitted epidemics of mpox are unprecedented in the UK) was made*
48 *available very early on too via BASHH [British Association of Sexual Health and HIV], which*
49 *made the whole thing seem more serious and 'real' and helped mobilise resources (staff time*
50 *and attention) to build the testing and referral pathways rapidly.”*
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55 *Respondent 78 – Sexual Health and HIV doctor*
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58 However, some respondents described a lack of strategic leadership which impeded an
59 effective response to mpox. Several respondents described developing their own guidelines
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3 and procedures, and felt they were left to make decisions with little external support. Some
4 respondents expressed their surprise that so little of the learning from managing COVID-19
5 was being applied to the mpox outbreak.
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9 *“Each clinic was constantly reinventing the wheel by developing local protocols for MPXV*
10 *patient management, PGD for vaccinations, vaccination procuring and delivery. This should*
11 *all have been managed centrally. Nothing learned from the COVID pandemic has been*
12 *translated to managing the MPXV response.”*
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17 *Respondent 101 – Sexual Health and HIV doctor*
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20 Respondents described how the absence of strategic leadership they identified led to poor
21 communication, with clinicians learning about policy changes through the media or from
22 patients and frequent changes in guidance. Some respondents felt that the mixed messaging
23 (particularly in relation to vaccine supply) contributed to patients’ frustration, of which
24 frontline clinicians bore the brunt. They felt the realities of sexual health clinical care were
25 poorly understood.
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31 *“Poorly thought out, unhelpful, and mixed messaging from UKHSA. Unable to tell the truth*
32 *to patients about vaccine supply leading to huge increase in abuse and aggression for*
33 *frontline staff. Multiple meetings with multiple different groups- none of whom were talking*
34 *to each other and many of whom had no idea how a sexual health clinic operated and*
35 *sometimes clinicians weren’t even involved until 3 weeks into the outbreak.”*
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41 *Respondent 35 – Sexual Health and HIV doctor*
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44 **Safety at work**

45 The majority (n=85.4%, n=144) of respondents reported that their clinic or service had
46 performed a risk assessment to ensure staff safety when dealing with people with suspected
47 or confirmed mpox. 93.8% rated the mpox infection control precautions in their clinic or
48 service as fairly, mostly, or entirely adequate. One respondent reported acquiring mpox,
49 although it is unclear whether the exposure was occupational. Three respondents (2.1%)
50 reported that colleagues had acquired mpox and no respondents reported family members
51 acquiring mpox.
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3 In the open text data, some respondents expressed concerns about their safety at work, in
4 particular those who felt especially at risk from complications from a potential infection, such
5 as pregnancy, long-COVID, or planned surgery. Some reported feeling that their concerns
6 were not adequately addressed by their employer.
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11 *Being pregnant at the time, I didn't receive a risk assessment at all, just told 'to stay away*
12 *from Monkeypox', yet I was around potential Monkeypox patients in the waiting room, in*
13 *clinic and around colleagues seeing patients and diagnosing Monkeypox. Especially*
14 *inadequate as I couldn't get vaccinated.*
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19 *Respondent 76 – Sexual Health and HIV doctor*
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21 In contrast, some respondents felt that infection control procedures were prioritised over
22 patient dignity, with the result that care provision was perceived to be stigmatising to
23 patients. The downgrading of mpox from a high-consequence infectious disease (HCID)
24 classification was perceived by some respondents to have taken too long, contributing to a
25 sense that infection control requirements were excessive and potentially stigmatising given
26 the perceived level of risk.
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33 **Vaccination**

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35 Less than a quarter (22.9%) of respondents (n=144) had received smallpox vaccination prior
36 to the 2022 mpox outbreak in the UK. By the time of the survey, 68.3% had been offered
37 vaccination against mpox, of whom 71.0% had received the vaccine. However, of those
38 vaccinated (n=86), 33.7% felt they had not received the vaccine in a timely and equitable
39 manner. Overall, 53.5% of respondents (n=144) considered mpox vaccination access in the
40 UK to be inadequate, with the key focus being on access for patients. The term “chaotic” was
41 used by several to describe vaccine delivery to patients, and some respondents felt they were
42 made to provide misleading information to patients about vaccine availability. Several
43 respondents described how the inadequate vaccine supply and poor communication around
44 this meant that delivery was inequitable in its impact on marginalised patients.
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54 *“Not fair that we can't vaccinate everyone in need and that outside London coverage has*
55 *been terrible. Also, that there's been no decent public messaging, and everything's had to be*
56 *spread through word of mouth. Disadvantages the un-connected gays.”*
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*Respondent 88 – Sexual Health and HIV doctor***Wellbeing**

Ninety-nine respondents (68.3%) reported experiencing some form of negative emotional impact due to their mpox work, with 50.3% reporting multiple symptoms. As depicted in Figure 2, the most commonly reported symptoms were stress (59.3%), fatigue (44.1%) and anxiety (35.9%). Stress, fatigue and anxiety were also the most common symptoms experienced by respondents prior to their work on mpox, but at lower rates (38.6%, 31.7%, 19.3%, respectively).

Figure 2. Symptoms experienced by healthcare workers during and prior to mpox outbreak (n=145)

[Insert Figure 2 here]

A substantial proportion of respondents reported feeling some level of burnout, either as a result of responding to mpox and COVID-19, or even prior to these outbreaks. 11.7% of all respondents reported feeling considerably or completely burnt out due to their work on mpox, while 53.8% reported feeling slight or moderate feelings of burnout, and 34.5% reported feeling not at all burnt out. Of the 83 (57.2%) respondents who had provided care to COVID-19 patients in the preceding two years, 12.0% reported feeling considerably or completely burnt out prior to the COVID-19 pandemic, 55.4% reported feeling slight or moderate feelings of burnout, and 32.5% reported feeling not at all burnt out.

When asked whether the experience of mpox in addition to the COVID-19 pandemic made them more or less likely to remain in health as a profession, 35.0% stated that they were less likely to remain, only 4.2% stated they were more likely to remain, and the remainder (60%) reported no change.

Many respondents ascribed these feelings to exhaustion from having to deal with another outbreak so soon after COVID-19. Some respondents felt that there was a lack of acknowledgement or consideration for the pressure that staff were already under prior to the mpox outbreak.

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3 *Although clinically challenging (...), this work coincided with increasing service pressures, and*
4 *without a resolution of the Covid pandemic (still very stressful to staff). We have had to*
5 *adapt and shift other clinical tasks, redesign clinics and services without necessarily*
6 *acknowledging the amount of low staff morale and distress we have all been through.*
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11 *Participant 50 – Sexual Health and HIV doctor*
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14 Some respondents described how understaffing meant they did not always feel they could
15 deliver adequate care, which exacerbated their stress. In addition, some felt the way in which
16 the mpox response was handled contributed to the distress and anger of patients.
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20 *Listening to the very distressing accounts from the MPX patients especially those who are*
21 *frightened & isolating alone and not being able help or support them better.*
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24 *Participant 8 – Sexual Health and HIV doctor*
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27 A few respondents expressed anger at patients who they felt did not take the outbreak
28 seriously or lacked empathy for the situation clinicians also found themselves in.
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31 DISCUSSION

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33 Our study, undertaken at the intersection of two major infectious disease outbreaks in the
34 UK in 2022 gives important insights into the challenges that pandemics pose to healthcare
35 workers. It is one of the first studies to explore the experiences of specialist UK healthcare
36 workers responding to mpox, with data collected at the height of the outbreak. Through the
37 combination of quantitative and qualitative data, our findings paint a picture of an
38 understaffed, under-resourced and underprepared workforce with little resilience to adapt
39 to the challenges of a novel outbreak soon after a recent pandemic. Staff wellbeing has
40 suffered, with high levels of stress and burnout contributing to staff reporting that they are
41 more likely to leave their profession.
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50 The experiences of respondents in our study reinforce the view that mpox landed on
51 services that were already under huge financial and workforce pressure. Previous studies
52 have identified that inadequate funding and resources for the mpox response has had
53 implications for routine sexual health care – risking efforts to tackle the competing public
54 health threats of HIV and increasing STI rates. A service evaluation of a UK clinic described
55 the temporary cancellation of routine sexual health services, such as warts clinics and
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3 vaccinations, in response to the increased workload brought about by the mpox outbreak
4 (27). Similarly, a US study reported a significant decline in HIV PrEP enrolment and STI
5 testing when STI care was deprioritised by a need to upscale mpox vaccination with limited
6 staff resource (28). HIV testing rates among certain population groups such as heterosexual
7 men and heterosexual and bisexual women are yet to return to the levels they were prior to
8 the COVID-19 pandemic (29). Disruption to routine sexual health services including HIV
9 testing threatens the UK's progress towards elimination of HIV transmission.
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16 In addition to concerns about their ability to deliver core sexual health services, respondents
17 highlighted worries about their ability to ensure optimal care for people with and/or at risk
18 of mpox. A key source of distress identified by this study was the rapidly changing and
19 inadequate information and guidance – also highlighted as an issue by UK healthcare
20 workers responding to the COVID-19 pandemic (4). This does not appear to be unique to the
21 UK, with healthcare workers across the globe grappling with a quagmire of fluctuating (and
22 sometimes contradictory) mpox policies and guidance during the outbreak (30), combined
23 with the additional pressure of vaccine shortage and inequitable global provision (31).
24 Rapidly changing guidance has knock-on effects for affected communities: our previous
25 survey of communities at risk of mpox in the UK highlighted perceptions of poor
26 communication by health authorities and a lack of trust in the early public health response
27 to mpox, especially among groups who already face social and structural barriers to care (1).
28 Producing reliable, coordinated, and consistent guidance is a common challenge in novel
29 outbreaks where knowledge is evolving, and it takes time for consensus to emerge.
30 However, while some examples of effective collaboration were highlighted in this study,
31 concerns about a lack of strategic coordination nationally and conflicting messaging indicate
32 that communication and coordination between key stakeholders must be improved to avoid
33 repeating past mistakes. Lessons can be learned from other countries as well as previous
34 epidemics – a recent policy report on the UK mpox response pointed to the United States
35 government's national mpox response team as an example of strategic leadership “between
36 and within organisations” (32).
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55 Encouragingly, we found high levels of acceptability of mpox vaccination among UK
56 healthcare workers, which contrasts with findings from other countries (33–36). Most
57 respondents felt safe at work, with very few mpox acquisitions reported. This corresponds
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3 with the reported low number of cases of occupational transmission of mpox across Europe
4 (37). Notably, most of the respondents to this survey encountered mpox in outpatient
5 services, where the risk of occupational infection is expected to be lower than inpatient
6 settings (38,39).
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11 Finally, the high levels of stress, fatigue, and anxiety reported by healthcare workers
12 responding to mpox are deeply concerning. This issue is endemic in the NHS more generally,
13 with 44.8% of NHS staff reported feeling unwell due to work-related stress in 2022 (40).
14 While COVID-19 undoubtedly created new pressures (41), poor mental health among
15 healthcare workers pre-dates the pandemic and the mpox outbreak (42). As well as being
16 challenging for staff, this also presents economic implications for the health system (poor
17 staff wellbeing has been estimated as costing the NHS £12.1 billion a year (43)) and
18 implications for the quality and safety of patient care (44).
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26 The study has limitations, and our findings should be interpreted with caution. This is a
27 convenience sample and although respondents were broadly reflective of the sexual and
28 reproductive health workforce in terms of gender, ethnicity, and age (45), it cannot be
29 described as representative. Using a single source of data (a survey), may have resulted in
30 limited representation of healthcare workers' views. Due to the exploratory nature of the
31 study, a power calculation was not conducted; consequently statistical analysis was limited
32 to describing results as the study was underpowered to explore associations between
33 variables and potential differences between subgroups (e.g., based on gender, professional
34 role, geography, race and ethnicity). Further, those who responded to the open text
35 questions and provided lengthier responses were generally those with negative experiences
36 of responding to the outbreak. Further research is needed to explore inequities in
37 healthcare workers' experiences of the mpox outbreak and to identify protective factors
38 which supported more positive experiences that can shape responses in the future.
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51 CONCLUSION

52 With future infectious disease outbreaks an inevitability, these findings indicate that greater
53 investment and coordination is required to ensure an effective national response and limit
54 any negative impact on healthcare worker wellbeing. Sexual health services need adequate
55 funding to support outbreak preparedness, address existing epidemics, and improve
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3 workforce retention. Mechanisms to improve strategic coordination and communication
4 between key stakeholders, including representatives of clinicians and affected populations,
5 is vital to ensure clear and consistent messaging. Finally, sustained investment in
6 coordinated, equitable partnerships between government agencies, clinical services, and
7 communities on the ground are essential to deliver evidence-based interventions to support
8 healthcare worker wellbeing, sustain patient-provider relationships, and promote
9 psychological resilience.
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Data sharing statement

The authors commit to making the relevant anonymised participant level data available on reasonable request and following consultation with the Queen Mary University of London Ethics of Research Committee.

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1
2
3 JA holds a consultant physician appointment at Homerton Healthcare NHS Foundation Trust
4 and is Chair of the National AIDS Trust. LW is former president of the British HIV Association.
5
6 CD is current president of the British Association for Sexual Health and HIV.
7
8

9 All other authors have no further competing interests to declare.
10
11

12 13 Transparency statement

14
15 The lead author (the manuscript's guarantor) affirms that the manuscript is an honest,
16 accurate, and transparent account of the study being reported; that no important aspects of
17 the study have been omitted; and that any discrepancies from the study as planned (and, if
18 relevant, registered) have been explained.
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23 24 Ethical approval

25
26 The study received ethical approval from the Queen Mary University of London Ethics of
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30

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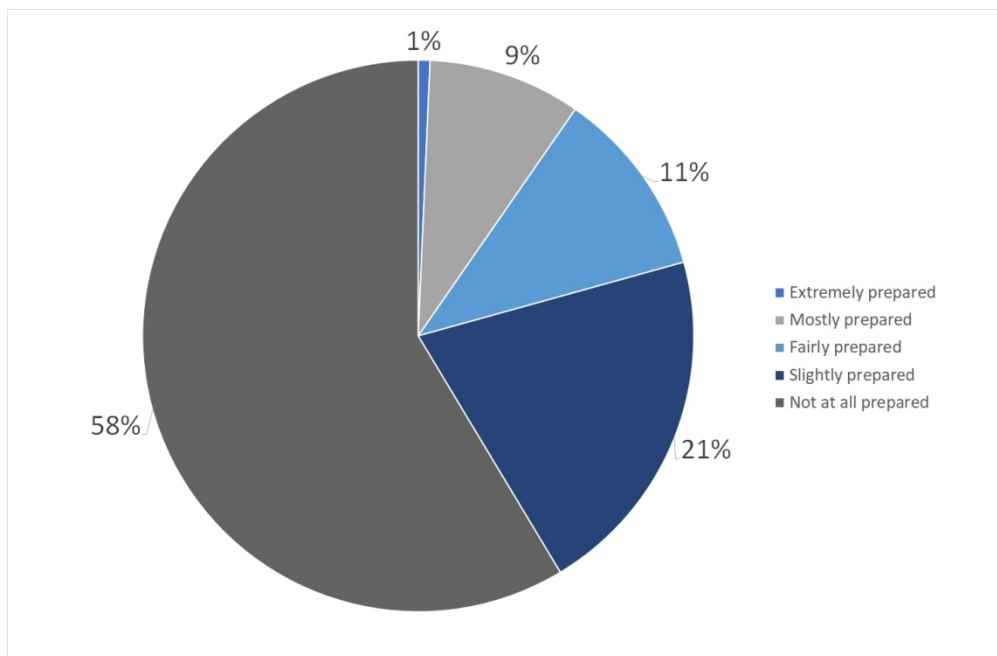
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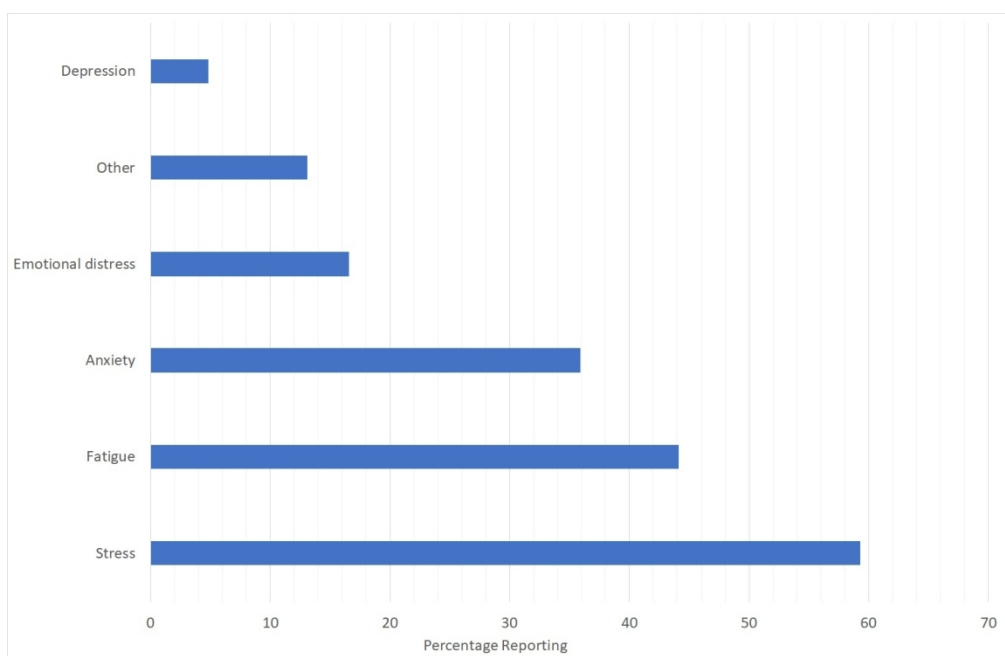
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STROBE Statement—Checklist of items that should be included in reports of *cross-sectional studies*

	Item No	Recommendation	Page No
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	1
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	4-5
Objectives	3	State specific objectives, including any prespecified hypotheses	2, 5
Methods			
Study design	4	Present key elements of study design early in the paper	5
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	5
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants	5-6
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	SAP ¹
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	5, SAP ¹
Bias	9	Describe any efforts to address potential sources of bias	16
Study size	10	Explain how the study size was arrived at	5
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	6, SAP ¹
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	SAP ¹
		(b) Describe any methods used to examine subgroups and interactions	SAP ¹
		(c) Explain how missing data were addressed	SAP ¹
		(d) If applicable, describe analytical methods taking account of sampling strategy	NA
		(e) Describe any sensitivity analyses	NA
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	6
		(b) Give reasons for non-participation at each stage	NA
		(c) Consider use of a flow diagram	NA
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	6-7
		(b) Indicate number of participants with missing data for each variable of interest	NA
Outcome data	15*	Report numbers of outcome events or summary measures	NA

¹ Available at <https://osf.io/2bufh>

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Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	6-14
		(b) Report category boundaries when continuous variables were categorized	NA
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	NA
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	NA
Discussion			
Key results	18	Summarise key results with reference to study objectives	14-16
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	16
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	14-16
Generalisability	21	Discuss the generalisability (external validity) of the study results	14-16
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	19

*Give information separately for exposed and unexposed groups.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is available at www.strobe-statement.org.

BMJ Open

A cross-sectional survey of sexual health professionals' experiences and perceptions of the 2022 mpox outbreak in the United Kingdom

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Keywords:	Public health < INFECTIOUS DISEASES, Health Workforce, Health policy < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, SEXUAL MEDICINE, Cross-Sectional Studies

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Title

A cross-sectional survey of sexual health professionals' experiences and perceptions of the 2022 mpox outbreak in the United Kingdom

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Abstract

Objective: To understand the experiences and perceptions of sexual health professionals responding to the May 2022 mpox outbreak in the United Kingdom (UK).

Design: Cross-sectional, anonymous, online survey collecting quantitative and qualitative data. Convenience sample recruited via an international network of sexual health and HIV clinicians responding to mpox and promoted through clinical associations and social media. Survey domains included clinical workload; preparedness, support, and training; safety at work; vaccination; and wellbeing. Qualitative descriptive analysis of open text responses was conducted to support interpretation of the quantitative data.

Participants: Participants who were employed as sexual health professionals in the UK and had direct clinical experience of mpox were included in the analysis. The survey was completed between 11 August and 31 October 2022 by 139 respondents, the majority of whom were doctors (72.7%), cis-female (70.5%) and White (78.4%).

Results: 70.3% reported that they were required to respond to mpox in addition to their existing clinical responsibilities, with 46.8% working longer hours as a result. In the free-text data, respondents highlighted that workload pressures were exacerbated by a lack of additional funding for mpox, pre-existing pressures on sexual health services, and unrealistic expectations around capacity. 67.6% of respondents reported experiencing negative emotional impact due to their mpox work, with stress (59.0%), fatigue (43.2%) and anxiety (36.0%) being the most common symptoms. 35.8% stated that they were less likely to remain in their profession because of their experiences during the mpox outbreak. In the free-text data, these feelings were ascribed to post-COVID exhaustion, understaffing, and frustration among some participants at the handling of the mpox response.

Conclusions: These findings indicate that sexual health services require increased funding and resources, along with evidence-based wellbeing interventions, to support sexual health professionals' outbreak preparedness and recovery.

Strengths and Limitations

Strengths

- This study is one of the first to explore the experiences of sexual health professionals responding to mpox in the UK, with data collected during the height of the outbreak.
- The collection of qualitative data via open-text questions helped to contextualise quantitative findings and centre sexual health professionals' experiences and voices within the study.

Limitations

- The convenience sampling strategy means the respondents and perspectives presented in this study may not be representative of the wider UK sexual and reproductive health workforce.
- The exploratory nature of the study constrained statistical analysis, as it was underpowered to explore associations between variables.

Main text

BACKGROUND

There is increasing awareness of the pressures that pandemics and their system-wide management place on healthcare professionals' physical, mental, and emotional health (1). The arrival of SARS-Cov-2 exposed multiple threats to healthcare professional wellbeing including fear of contagion (and subsequent transmission to others), exacerbated by a lack of adequate PPE, inadequate and rapidly changing guidance and training, and inconsistent information (2–4). Staff also faced higher workloads, disruptions to daily routines and team dynamics, negative impacts on personal and professional identity, and threats to psychological safety (2,5). Outside of work, healthcare professionals also experienced stigma in the community (related to fear of contagion) and disruptions to family relationships (2,4).

May 2022 marked the beginning of what became the largest and geographically most widespread mpox (formerly monkeypox) outbreak to be reported outside the principal historically affected countries in western and central Africa. Within 3 months the outbreak was declared a Public Health Emergency of International Concern by the World Health Organization (6), coinciding with a time when health systems were already significantly overstretched by the ongoing COVID-19 pandemic (7).

Known risk factors for acquiring mpox include contact with fomites, bodily fluids, and airborne droplets (8–10), and the most evidenced and protective non-behavioural intervention is the smallpox vaccine (11,12). The latest outbreak, however, differed from previous outbreaks and presented new challenges. First, the timing of the outbreak coincided with the lifting of travel and other restrictions associated with the COVID-19 pandemic, with early cases linked to the re-commencing of large events, parties and increases in close social and sexual contact (13). Secondly, unlike previous outbreaks of mpox, transmission has been associated with sexual networks of gay or bisexual men and other men who have sex with men. Thirdly, clinical presentation has changed and now frequently includes anogenital lesions (14). These combined factors have put sexual health professionals on the frontline of the response.

Between 6 May 2022 to 30 September 2023, there were 3732 cases of mpox in the UK, with 95% of these cases confirmed in England (15). At the peak of the outbreak, in July 2022, UK

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3 sexual health services were dealing with 350 cases of mpox every week (15). The
4 unanticipated pressure of mpox was layered upon an already overstretched and depleted
5 sexual and reproductive health workforce. In addition to COVID-19-associated disruption and
6 burnout, sexual and reproductive health services were dealing with an ongoing crisis in
7 recruitment and retention of staff (16–18) coupled with reduced funding and rising demand
8 for services (19). Unlike most clinical services, sexual health services in England are funded
9 from highly constrained local authority public health budgets rather than from central health
10 system's funds in the National Health Service (NHS). As well as risking increased transmission
11 of mpox, clinical leaders noted that unexpected and unfunded mpox clinical activity was
12 competing with and displacing core sexual and reproductive health services, threatening the
13 sustainability of services and public health (20).

24 Given this context, mpox likely placed a significant burden on sexual health professionals.
25 However, beyond data on exposure risks of mpox in health care settings (21,22), little is
26 known so far about the wider experience and impact of the outbreak on sexual health
27 professionals. We sought to address this gap by conducting a rapid appraisal of the
28 experiences and perceptions of UK sexual health professionals involved in the response to the
29 2022 multi-country mpox outbreak.

38 METHODS

40 Between 11 August and 31 October 2022, a cross-sectional, anonymous, online survey was
41 conducted with international healthcare professionals involved in the multi-country
42 outbreak of mpox. The questionnaire (available at <https://osf.io/dmu65>) was developed
43 using literature related to healthcare worker experience of infectious disease outbreaks (2–
44 5) and the clinical expertise within the authorship team [VA, CD, LW, JA, CO]. It was also
45 reviewed by clinical colleagues in several countries within SHARE-Net (23), an informal
46 network of researchers and clinicians responding to mpox from around the world,
47 established at the beginning of the multi-country outbreak in May. The survey contained 87
48 new (non-validated) questions, assessing: clinical workload; preparedness, support and
49 training; safety at work; mpox vaccination; wellbeing; and mpox research. Both closed
50 (single- and multi-response questions) and open-text questions were used, as well as
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3 questions regarding demographic characteristics (e.g., age, gender identity, sexual
4 orientation, and ethnicity). The survey was constructed using SmartSurvey software
5 (SmartSurvey Ltd, Tewkesbury, UK) (24) and disseminated in English, Spanish, French and
6 Portuguese.
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11 International survey dissemination was via SHARE-Net, as well as via newsletters and social
12 media channels of the British Association for Sexual Health (BASHH), the British HIV
13 Association (BHIVA), European AIDS Clinical Society (EACS) and International AIDS Society
14 (IAS).
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19 The analysis for this paper was restricted to respondents who reported working in sexual
20 health in the UK, as this allowed for greater exploration of country- and context-specific
21 factors influencing healthcare professionals' experiences. A manuscript analysing responses
22 from the entire international sample is forthcoming.
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27 Quantitative data analysis was undertaken by MS using Stata 17 (StataCorp LLC, College
28 Station, TX, USA) (25) following a prespecified statistical analysis plan (available at
29 <https://osf.io/2bufh>). All authors provided iterative feedback. Denominators (n) are shown in
30 the text when missing responses occurred.
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35 The qualitative data collected expanded in open text boxes on specific questions (e.g., "How
36 satisfied were you with the support your clinic/service received from your national public
37 health agency? Why/why not?"). Qualitative data were analysed using descriptive qualitative
38 analysis (26) in NVivo v1.7 (Lumivero, Burlington, MA, USA) as a pragmatic approach to
39 handling large numbers of entries of short textual data. Free-text data was deductively
40 organised by the question's survey domain, then RH inductively generated the coding
41 categories and brief findings within these domains, with iterative feedback from remaining
42 authors. Respondent quotations are provided in each section to provide context to the
43 statistical findings.
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52 The study received ethical approval from the Queen Mary University of London Ethics of
53 Research Committee (QMERC22.297) and online informed consent was obtained from all
54 respondents at the beginning of the questionnaire.
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Patient and public involvement

No patient and public involvement was conducted as part of this study as the research was focused on the experiences of healthcare professionals. However, our research team includes sexual health and HIV clinicians with firsthand experience of caring for patients with mpox during the 2022 outbreak [VA, CD, LW and CO]. We conducted a separate project to understand the experiences of communities affected by mpox which was co-produced with two community-based organisations involved in sexual health promotion and advocacy (27).

RESULTS

Participant characteristics

A total of 139 UK respondents completed the survey; their demographics are presented in Table 1. Most were doctors (73.8%) or nurses (24.8%). All respondents had been involved clinically (i.e. diagnosing and treating) with people with mpox. The main sites of care for patients with mpox were sexual health clinics (92.8%), specialist HIV clinics (22.3%), in-patient wards (9.4%), and emergency departments (5.8%). Most respondents identified as cis-female (70.5%). 13.0% of respondents identified as a gay or bisexual man. The majority of the sample identified as White (78.4%).

Table 1. Survey respondent characteristics (n=139)

Category	n	%
Age		
18-25	1	0.7
26-30	12	8.6
31-34	13	9.4
35-40	19	13.7
41-50	47	33.8
51-60	38	27.3
60+	9	6.5
Gender		
Cis-Female	98	70.5
Cis-Male	35	26.2
Trans-Male	1	0.7
Non-binary	2	1.4
Prefer not to say	3	2.2
Do you identify as a gay or bisexual man?		
Yes	18	13.0
No	118	84.9

Prefer not to say	3	2.2
Ethnicity		
White	109	78.4
Black	3	2.2
Asian	13	9.4
Latino / Latinx	1	0.7
Arab	1	0.7
Mixed or multiple ethnic groups	10	7.2
Other	2	1.4
Professional role		
Doctor	101	72.7
Nurse	36	25.9
Health Promotion Worker	2	1.4
Where did you see suspected or confirmed clinical cases of monkeypox?*		
Sexual health clinic (community, public, private)	129	92.8
Infectious disease clinic	2	1.4
Emergency department	8	5.8
HIV clinic	31	22.3
Dermatology clinic	1	0.7
General practice	1	0.7
In-patient ward	13	9.4

* Participants could select multiple options.

Clinical workload

During the first four weeks of the UK mpox outbreak, over one third of respondents (33.8%) reported that at least quarter of their working time was taken up with mpox and 19.4% reported that more than half of their time was mpox-focused. The majority (0.3%) reported that their other existing clinical responsibilities had not been removed to allow them to focus on mpox-related work, with nearly half (46.8%) working longer hours as a result of mpox.

Respondents carried out a range of tasks as part of their mpox-related clinical work, most commonly direct patient care (97.1%), contacting mpox patients or their contacts (73.4%), and developing local protocols and operational guidance (59.0%).

Four themes were identified in the open-text data in relation to mpox-related workload: a lack of additional funding or resources, existing pressures on services, unrealistic expectations around capacity to respond to mpox, and implications for other sexual health services.

Many respondents noted that the increased workload associated with mpox was not matched by additional funding, with some describing a sense that mpox was being 'dumped'

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3 on sexual health services. Respondents had to work additional hours as a result and felt
4 there was little recognition for this (including no paid overtime).
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7 *“Expected to do a lot at speed with no additional support or resource.”*
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10 *Respondent 12 – Doctor, cis-female, Mixed or Multiple Ethnic Group, aged 35-40.*
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12 Others highlighted that understaffing due to COVID-19, along with previous budgetary cuts,
13 meant that these additional responsibilities were being assigned to services already under
14 extreme pressure.
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18 *“I think even before covid the pressure within sexual health was such that it felt like you had
19 to rush through patients and didn't have the time to give the care that was needed”*
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23 *Respondent 10 – Nurse, cis-female, White, aged 35-40.*
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25 Reporting requirements to the national public health agency, the UK Health Security Agency
26 (UKHSA), added significant pressure. Some respondents felt that UKSHA's expectations of
27 how sexual health services should respond to the outbreak were unrealistic.
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31 *“There was a significant mismatch between the resources we had and the resources we were
32 expected to devote to the UKHSA processes (reporting cases, reporting on case
33 management, patient follow-ups, attendance at meetings, infection control)”*
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38 *Respondent 78 – Doctor, cis-male, White, aged 41-50.*
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40 Respondents attributed this to a lack of understanding about the reality of sexual health
41 services such as staffing levels, the logistics of applying guidance designed for highly
42 controlled in-patient settings to open-access clinics, and having the infrastructure in place
43 for services such as 24-hour on call rota. Several respondents were concerned about the
44 impact on other sexual health services.
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50 *“We have had acutely unwell patients EG: Herpes, PID [Pelvic Inflammatory Disease] care
51 unacceptably delayed by the need to phone triage and prioritise monkeypox testing.”*
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54 *Respondent 25 – Doctor, cis-female, White, aged 51-60.*
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Preparedness, support, and training

When asked how personally prepared they were for the mpox outbreak, more than three-quarters (81.3%) of respondents said they were not at all or only slightly prepared. Over half (52.5%) of respondents had never heard of mpox prior to the outbreak. Respondents expressed a marked lack of confidence about their ability to care for people with mpox. Over half (56.8%) of respondents described themselves as not at all confident in managing suspected or confirmed mpox cases at the start of the outbreak, with 31.7% suggesting they had initially misdiagnosed a mpox-related rash.

However, 78.4% had received education, training, or instruction about mpox specifically. Most commonly this was in the form of written guidance (60.4%), in-house practice education (54.7%), practical PPE instruction (33.1%), and lectures, webinars, or presentations (31.7%). Of those who had received mpox-related training or education and rated it (n=108), 11.1% rated this entirely adequate, 79.6% rated it fairly or mostly adequate, and 9.3% rated it only slightly or not at all adequate. Less than one third (27.3%) of respondents had completed any type of general infectious disease outbreak management education and training.

Nearly two-thirds (62.6%) of respondents agreed or strongly agreed that their employing institution had provided clear, timely and authoritative information about mpox. When asked how satisfied they were with the support their clinic or service received from the national public health agency (n=136), 61.8% said they were fairly, mostly or extremely satisfied, and 38.2% said they were only slightly or not at all satisfied.

In the open text data, those who were satisfied with the response were understanding that the novelty of the outbreak meant that the public health agency initially lacked information about how best to respond, and guidance changed as understanding increased. Others said they felt the public health agency worked well with professional clinical bodies, and that the information and training provided was excellent.

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“UKHSA's knowledge of the infection (which was unavoidably not based on any previous outbreak as sexually transmitted epidemics of mpox are unprecedented in the UK) was made available very early on too via BASHH.”

Respondent 78 – Doctor, cis-male, White, aged 41-50.

However, some respondents described a lack of strategic leadership which impeded an effective response to mpox. Several respondents described developing their own guidelines and procedures, and felt they were left to make decisions with little external support. Some respondents expressed surprise that so little of the learning from managing COVID-19 was being applied to the mpox outbreak.

“Each clinic was constantly reinventing the wheel by developing local protocols for MPXV [mpox] patient management, PGD for vaccinations, vaccination procuring and delivery. This should all have been managed centrally. Nothing learned from the COVID pandemic has been translated to managing the MPXV response.”

Respondent 101 – Doctor, cis-male, gay/bi man, White, aged 41-50.

Respondents described how the absence of strategic leadership they identified led to poor communication, with clinicians learning about policy changes through the media or from patients and frequent changes in guidance. Some respondents felt that the mixed messaging (particularly in relation to vaccine supply) contributed to patients' frustration, of which frontline clinicians bore the brunt. They felt the realities of sexual health clinical care were poorly understood.

“Poorly thought out, unhelpful, and mixed messaging from UKHSA. Unable to tell the truth to patients about vaccine supply leading to huge increase in abuse and aggression for frontline staff. Multiple meetings with multiple different groups – none of whom were talking to each other and many of whom had no idea how a sexual health clinic operated.”

Respondent 35 – Doctor, cis-female, White, aged 41-50.

Safety at work

The majority (n=85.5%, n=138) of respondents reported that their clinic or service had performed a risk assessment to ensure staff safety when dealing with people with suspected or confirmed mpox. 93.5% rated the mpox infection control precautions in their clinic or

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3 service as fairly, mostly, or entirely adequate. One respondent reported acquiring mpox,
4 although it is unclear whether the exposure was occupational. Three respondents (2.2%)
5 reported that colleagues had acquired mpox and no respondents reported family members
6 acquiring mpox.
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11 In the open text data, some respondents expressed concerns about their safety at work, in
12 particular those who felt especially at risk from complications from a potential infection, such
13 as pregnancy, long-COVID, or planned surgery. Some reported feeling that their concerns
14 were not adequately addressed by their employer.
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19 *I didn't receive a risk assessment at all, just told 'to stay away from Monkeypox', yet I was*
20 *around potential Monkeypox patients in the waiting room, in clinic and around colleagues*
21 *seeing patients and diagnosing Monkeypox. Especially inadequate as I couldn't get*
22 *vaccinated.*
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27 *Respondent 76 – Doctor, cis-female, White, aged 31-34.*
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30 In contrast, some respondents felt that infection control procedures were prioritised over
31 patient dignity, resulting in care provision perceived to be stigmatising to patients. The
32 downgrading of mpox from a high-consequence infectious disease (HCID) classification was
33 perceived by some respondents to have taken too long, contributing to a sense that infection
34 control requirements were excessive and potentially stigmatising given the perceived level of
35 risk.
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40 41 **Vaccination**

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43 Less than a quarter (21.7%) of respondents (n=138) had received smallpox vaccination prior
44 to the 2022 mpox outbreak in the UK. By the time of the survey, 69.1% had been offered
45 vaccination against mpox, of whom 70.1% had received the vaccine. However, of those
46 vaccinated (n=83), 34.9% felt they had not received the vaccine in a timely and equitable
47 manner. Overall, 55.8% of respondents (n=138) considered mpox vaccination access in the
48 UK to be not at all adequate, with the key focus being on access for patients. The term
49 “chaotic” was used by several to describe vaccine delivery to patients, and some respondents
50 felt they were made to provide misleading information to patients about vaccine availability.
51 Several respondents described how the inadequate vaccine supply and poor communication
52 around this meant that delivery was inequitable in its impact on marginalised patients.
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“Not fair that we can't vaccinate everyone in need and that outside London coverage has been terrible. Also, that there's been no decent public messaging, and everything's had to be spread through word of mouth. Disadvantages the un-connected gays.”

Respondent 88 – Doctor, non-binary, White, aged 31-34.

Wellbeing

Ninety-four respondents (67.6%) reported experiencing some form of negative emotional impact due to their mpox work, with 50.4% reporting multiple symptoms. The most commonly reported symptoms were stress (59.0%), fatigue (43.2%) and anxiety (36.0%). Stress, fatigue and anxiety were also the most common symptoms experienced by respondents prior to their work on mpox, but at lower rates (38.1%, 30.9%, 20.1%, respectively).

A substantial proportion of respondents reported feeling some level of burnout, either as a result of responding to mpox and COVID-19, or even prior to these outbreaks. 10.8% of all respondents reported feeling considerably or completely burnt out due to their work on mpox, while 54.0% reported feeling slight or moderate feelings of burnout, and 35.3% reported feeling not at all burnt out. Of the 77 (55.4%) respondents who had provided care to COVID-19 patients in the preceding two years, 13.0% reported feeling considerably or completely burnt out prior to the COVID-19 pandemic, 55.8% reported feeling slight or moderate feelings of burnout, and 31.2% reported feeling not at all burnt out.

When asked whether the experience of mpox in addition to the COVID-19 pandemic made them more or less likely to remain in health as a profession, 35.8% stated that they were less likely to remain, only 4.4% stated they were more likely to remain, and the remainder (~60%) reported no change.

Many respondents ascribed these feelings to exhaustion from having to deal with another outbreak so soon after COVID-19. Some respondents felt that there was a lack of acknowledgement or consideration for the pressure that staff were already under prior to the mpox outbreak.

This work coincided with increasing service pressures, and without a resolution of the Covid pandemic (still very stressful to staff). We have had to adapt and shift other clinical tasks,

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3 *redesign clinics and services without necessarily acknowledging the amount of low staff*
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5 *morale and distress we have all been through.*

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8 *Participant 50 – Doctor, cis-male, White, aged 51-60.*
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10 Some respondents described how understaffing meant they did not always feel they could
11 deliver adequate care, which exacerbated their stress. In addition, some felt the way in which
12 the mpox response was handled contributed to the distress and anger of patients.
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16 *Listening to the very distressing accounts from the MPX [mpox] patients especially those*
17 *who are frightened & isolating alone and not being able help or support them better.*
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21 *Participant 8 – Doctor, cis-female, White, aged 51-60.*
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23 A few respondents expressed anger at patients who they felt did not take the outbreak
24 seriously or lacked empathy for the situation clinicians also found themselves in.
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27 **DISCUSSION**

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29 Our study, undertaken at the intersection of two major infectious disease outbreaks in the
30 UK in 2022 gives important insights into the challenges that pandemics pose to health
31 professionals. It is one of the first studies to explore the experiences of sexual health
32 professionals responding to mpox in the UK, with data collected at the height of the
33 outbreak. Through the combination of quantitative and qualitative data, our findings paint a
34 picture of an understaffed, under-resourced and underprepared workforce with little
35 resilience to adapt to the challenges of a novel outbreak soon after a recent pandemic. Staff
36 wellbeing has suffered, with high levels of stress and burnout contributing to staff reporting
37 that they are more likely to leave their profession.
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41 The experiences of respondents in our study reinforce the view that mpox landed on
42 services that were already under huge financial and workforce pressure. Previous studies
43 have identified that inadequate funding and resources for the mpox response has had
44 implications for routine sexual health care – risking efforts to tackle the competing public
45 health threats of HIV and increasing STI rates. A service evaluation of a UK clinic described
46 the temporary cancellation of routine sexual health services, such as warts clinics and
47 vaccinations, in response to the increased workload brought about by the mpox outbreak
48 (28). Similarly, a US study reported a significant decline in HIV PrEP enrolment and STI
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3 testing when STI care was deprioritised by a need to upscale mpox vaccination with limited
4 staff resource (29). HIV testing rates among certain population groups such as heterosexual
5 men and heterosexual and bisexual women are yet to return to the levels they were prior to
6 the COVID-19 pandemic (30). Disruption to routine sexual health services including HIV
7 testing threatens the UK's progress towards elimination of HIV transmission.
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13 In addition to concerns about their ability to deliver core sexual health services, respondents
14 highlighted worries about their ability to ensure optimal care for people with and/or at risk
15 of mpox. A key source of distress identified by this study was the rapidly changing and
16 inadequate information and guidance – also highlighted as an issue by UK healthcare
17 professionals responding to the COVID-19 pandemic (3). This does not appear to be unique
18 to the UK, with healthcare professionals across the globe grappling with a quagmire of
19 fluctuating (and sometimes contradictory) mpox policies and guidance during the outbreak
20 (31), combined with the additional pressure of vaccine shortage and inequitable global
21 provision (32). Rapidly changing guidance has knock-on effects for affected communities:
22 our previous survey of communities at risk of mpox in the UK highlighted perceptions of
23 poor communication by health authorities and a lack of trust in the early public health
24 response to mpox, especially among groups who already face social and structural barriers
25 to care (27).
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31 Producing reliable, coordinated, and consistent guidance is a common challenge in novel
32 outbreaks where knowledge is evolving, and it takes time for consensus to emerge.
33 However, while some examples of effective collaboration were highlighted in this study,
34 concerns about a lack of strategic coordination nationally and conflicting messaging indicate
35 that communication and coordination between key stakeholders must be improved to avoid
36 repeating past mistakes. Lessons can be learned from other countries as well as previous
37 epidemics – a recent policy report on the UK mpox response pointed to the United States
38 government's national mpox response team as an example of strategic leadership “between
39 and within organisations” (33). Encouragingly, we found high levels of acceptability of mpox
40 vaccination among UK sexual health professionals, which contrasts with findings among
41 healthcare professionals in other countries (34–37). Most respondents felt safe at work,
42 with very few mpox acquisitions reported. This corresponds with the reported low number
43 of cases of occupational transmission of mpox across Europe (38). Notably, most of the
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respondents to this survey encountered mpox in outpatient services, where the risk of occupational infection is expected to be lower than inpatient settings (39,40).

Finally, the high levels of stress, fatigue, and anxiety reported by sexual health professionals responding to mpox are deeply concerning. This issue is endemic in the NHS more generally, with 44.8% of NHS staff reported feeling unwell due to work-related stress in 2022 (41).

While COVID-19 undoubtedly created new pressures (42), poor mental health among healthcare professionals pre-dates the pandemic and the mpox outbreak (43). As well as being challenging for staff, this also presents economic implications for the health system (poor staff wellbeing has been estimated as costing the NHS £12.1 billion a year (44)) and implications for the quality and safety of patient care (45).

The study has limitations, and our findings should be interpreted with caution. This was an exploratory study in a new outbreak intended to provide foundational knowledge regarding the experiences of clinicians responding to a novel presentation of an unfamiliar disease. Consequently, it relied on a convenience sample and cannot be described as representative. While demographic data for the overall sexual health and HIV workforce are not available, for comparison there were estimated to be 531 consultants working in sexual health and HIV in the UK in 2022, of whom 66.0% were female, 63% were White, and the median age group was 45-49 (46) Using a single source of data (a survey), may have resulted in limited representation of sexual health professionals' views. A power calculation was not conducted and therefore statistical analysis was limited to describing results as the study was underpowered to explore associations between variables and potential differences between subgroups (e.g., based on gender, professional role, geography, race and ethnicity). Further, those who responded to the open text questions and provided lengthier responses were generally those with negative experiences of responding to the outbreak. More robust research is needed in future to explore inequities in sexual health professionals' experiences of the mpox outbreak and to identify protective factors which supported more positive experiences that can shape responses in the future.

CONCLUSION

With future infectious disease outbreaks an inevitability, these findings indicate that greater investment and coordination is required to ensure an effective national response and limit

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3 negative impact on healthcare professional wellbeing. Sexual health services need adequate
4 funding to support outbreak preparedness, address existing epidemics, and improve
5 workforce retention. Mechanisms to improve strategic coordination and communication
6 between key stakeholders, including representatives of clinicians and affected populations,
7 is vital to ensure clear and consistent messaging. Finally, sustained investment in
8 coordinated, equitable partnerships between government agencies, clinical services, and
9 communities on the ground are essential to deliver evidence-based interventions to support
10 healthcare professional wellbeing, sustain patient-provider relationships, and promote
11 psychological resilience.
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Contributors

RH was responsible for qualitative analysis of the open text data, interpretation of the results, and drafting of the original manuscript and subsequent versions. FD contributed to the interpretation of the results, the drafting of the original manuscript, and with comments and input to subsequent versions. MS was responsible for the statistical analysis of the closed text data and interpretation of the results and contributed to the design of the study and with comments and input on different drafts of the manuscript. SP contributed to the qualitative analysis of the open text data and interpretation of the results, and with comments and input on different drafts of the manuscript. VA was responsible with CO for conceiving and designing the study, contributed to the interpretation of results, and with comments and input on different drafts of the manuscript. CD contributed to the design of the study, supported data collection, and contributed to the interpretation of the results and with comments and input on different drafts of the manuscript. LW contributed to the design of the study, supported data collection, and contributed to the interpretation of the results and with comments and input on different drafts of the manuscript. JA contributed to the design of the study, supported data collection, and contributed to the interpretation of the results and with comments and input on different drafts of the manuscript. CO was responsible with VA for conceiving and designing the study, contributed to the interpretation of results, and with comments and input on different drafts of the manuscript. All authors approved the final version and agreed to be accountable for all aspects of the work.

Data sharing statement

The authors commit to making the relevant anonymised participant level data available on reasonable request and following consultation with the Queen Mary University of London Ethics of Research Committee.

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Competing interests statement

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JA holds a consultant physician appointment at Homerton Healthcare NHS Foundation Trust and is Chair of the National AIDS Trust. LW is former president of the British HIV Association. CD is current president of the British Association for Sexual Health and HIV.

All other authors have no further competing interests to declare.

Transparency statement

The lead author (the manuscript's guarantor) affirms that the manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned (and, if relevant, registered) have been explained.

Ethical approval

The study received ethical approval from the Queen Mary University of London Ethics of Research Committee (QMERC22.297).

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STROBE Statement—Checklist of items that should be included in reports of *cross-sectional studies*

	Item No	Recommendation	Page No
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	1
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	4-5
Objectives	3	State specific objectives, including any prespecified hypotheses	2, 5
Methods			
Study design	4	Present key elements of study design early in the paper	5
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	5
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants	5-6
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	SAP ¹
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	5, SAP ¹
Bias	9	Describe any efforts to address potential sources of bias	16
Study size	10	Explain how the study size was arrived at	5
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	6, SAP ¹
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	SAP ¹
		(b) Describe any methods used to examine subgroups and interactions	SAP ¹
		(c) Explain how missing data were addressed	SAP ¹
		(d) If applicable, describe analytical methods taking account of sampling strategy	NA
		(e) Describe any sensitivity analyses	NA
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	6
		(b) Give reasons for non-participation at each stage	NA
		(c) Consider use of a flow diagram	NA
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	6-7
		(b) Indicate number of participants with missing data for each variable of interest	NA
Outcome data	15*	Report numbers of outcome events or summary measures	NA

¹ Available at <https://osf.io/2bufh>

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Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	6-14
		(b) Report category boundaries when continuous variables were categorized	NA
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	NA
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	NA
Discussion			
Key results	18	Summarise key results with reference to study objectives	14-16
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	16
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	14-16
Generalisability	21	Discuss the generalisability (external validity) of the study results	14-16
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	19

*Give information separately for exposed and unexposed groups.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is available at www.strobe-statement.org.