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Clinical research in the NHS: a cross-sectional study of research engagement during the monkeypox pandemic

Yize I Wan ,^{1,2} Melanie Smuk,³ Rupert M Pearse,^{1,2} Sara Papparini ,⁴
Vanessa J Apea,^{4,5} Chloe M Orkin ^{3,5}

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¹William Harvey Research Institute, Faculty of Medicine and Dentistry, Queen Mary University of London, London, EC1M 6BQ, UK

²Acute Critical Care Research Unit, Royal London Hospital, Barts Health NHS Trust, London, E1 1BB, UK

³Blizard Institute, Faculty of Medicine and Dentistry, Queen Mary University of London, London, E1 2AT, UK

⁴Wolfson Institute of Population Health, Faculty of Medicine and Dentistry, Queen Mary University of London, London, EC1M 6BQ, UK

⁵Department of Infection and Immunity, Royal London Hospital, Barts Health NHS Trust, London, E1 1BB, UK

Correspondence to

Dr Yize I Wan, William Harvey Research Institute, Faculty of Medicine and Dentistry, Queen Mary University of London, London, EC1M 6BQ, UK; yize.wan@qmul.ac.uk

VJA and CMO are joint senior authors.

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ABSTRACT

Background Recruitment and retention of clinical academics in the UK is under threat. Acute clinical crises can increase opportunities for clinical research. We aimed to examine research involvement among clinicians working in sexual health and HIV medicine during the monkeypox (mpox) pandemic and identify factors associated with differential research engagement.

Methods We carried out a cross-sectional study between August and October 2022 using anonymised, self-reported data collected via an online survey disseminated worldwide across multiple specialties. We assessed demographic characteristics, research involvement and outputs, workplace setting, involvement with policy work and public health agencies and media. We examined differences by geographical location comparing the UK, European Union (EU) and the USA.

Results Of 139 total respondents from the UK, none identified themselves as clinical researchers, compared with 23/210 (11.0%) from the EU and 5/58 (8.6%) from the USA. Overall research engagement was lowest in the UK (15.1% vs EU 36.7% and USA 37.9%). In the UK, research activity was greater among consultant physicians (19.5% vs 18.8% doctors-in-training and 4.9% nurses), those aged 35–50 years (19.7% vs 15.4% <35 and 8.5% >50 years), males (34.3% vs 7.1% females and 33.3% non-binary) and those who self-identified as White (15.6% vs 13.3% all other). In research-active individuals, measurable research achievements by journal publications or submissions and obtainment of grant funding were significantly higher in older, male, White, consultant physicians. Less disparity across demographic characteristic groups were seen in both the EU and the USA compared with the UK reflecting more diversity among research-active clinicians in overall research activity. Markers of research achievement were closer to parity in representation across gender and race and ethnicity, particularly for the EU.

Conclusions Adherence to and evaluation of existing UK-based recommendations to improve the clinical academic pipeline are needed to increase research engagement and diversity to safeguard future UK clinical research.

INTRODUCTION

Clinical academics sit at the interface between research and healthcare, bringing their clinical knowledge into research and exporting their novel therapies, devices and discoveries into clinical care. This synergy can improve clinical outcomes and

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ The future of clinical academia in the UK is under threat due to a fragile NHS workforce, infrastructure and environment. Reasons for poor recruitment and retention include lack of mentorship, insufficient job security, delayed career progression, and pay.

WHAT THIS STUDY ADDS

⇒ During the mpox pandemic, which was an opportunity to produce research, both rates of overall self-reported research engagement and diversity among research-active clinicians were significantly lower in the UK compared with both the European Union (EU) and the USA. Reduced engagement with clinical research was especially noticeable in at earlier stages of training, in women, and those from racially minoritised backgrounds.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ Evaluation of the existing UK-based recommendations to improve the clinical academic pipeline is needed to determine their usefulness. This evaluation should be codesigned by a diverse range of people with protected characteristics with potential to form the future clinical academic pipeline such as junior and senior clinical academics and research-active clinicians.

contribute to efficiencies. In the UK NHS setting, the value of wider engagement with research was clearly evidenced during the COVID-19 pandemic. The UK-led RECOVERY trial was ground-breaking and identified four potential therapies for SARS-CoV-2.¹ Its delivery was an enormous feat made possible only through a functioning and coordinated network of clinical academic and other research-active National Health Service (NHS) staff. It exemplifies the academic power that can be leveraged when cutting-edge academic experts are combined with a large NHS workforce. The availability of an academic clinical pathway may also add interest to medical careers and mitigate the dwindling medical workforce.

However, the number of clinical academics in the UK has declined and there are ongoing disparities in the academic workforce with respect to age, gender, and race and ethnicity.^{2–4} Unlike the job

security of permanent NHS posts, academic posts are more insecure because early career contracts are based on insecure short-term funding with a requirement to continue to get funding.⁵ Additionally, academic training pathways are longer, and therefore, pay scales increase more slowly. This has contributed to a 'leaky' pipeline for young clinical academics who are in their early 30's.^{5,6} This is particularly applicable to women and others in whom job security is of paramount importance due to financial precarity. These are clear disincentives to pursuing clinical academia as a career path highlighted in a recent inquiry into clinical academic training pathways in the NHS led by Baroness Brown of Cambridge.⁶ Current research is lacking quantitative data on career progression, publication rates and grant successes for clinical academics.

In May 2022, simultaneous human monkeypox (mpox) outbreaks began in Europe and were declared a public health emergency of international concern by the WHO in June.⁷ The infection almost exclusively affected the networks of gay and bisexual men who have sex with men and sexual health physicians formed the vanguard of the mpox response in the UK.⁸ The sexual health workforce is composed of 498 consultant physicians, of which 328 (66%) are female.⁹ Like the COVID-19 pandemic, this represented an enormous challenge to an already stretched sexual health workforce and also a prime opportunity for clinical academics and research-active clinicians to produce high-quality, much-needed clinical research to address the challenge of a re-emerging infection behaving very differently. In this study, we aimed to examine levels of research engagement within a well-defined clinical specialty during a distinct time period. We aimed to determine factors associated with differential rates of research activity in order to assess patterns, trends, and potential biases, and better understand reasons and identify solutions for the declining academic workforce.

METHODS

We conducted an international cross-sectional study between August and October 2022 examining engagement with clinical research among healthcare professionals involved in the response to the mpox pandemic. To focus on individuals within the sexual health and HIV medicine specialty, we included all individuals who confirmed clinical involvement with the mpox response and had clinical contact with patients in sexual health clinics or HIV clinics. This analysis was restricted to individuals residing in the UK, the European Union (EU) and the USA.

Data collection

Anonymised, self-reported data were collected via an online survey containing a range of questions on demographic characteristics, involvement in mpox clinical, research, and policy-related work, self-assessment of knowledge and confidence around mpox diagnosis and management and views on outbreak preparedness, educational resources, workload, assessment of risk, and perceptions of moral distress and moral injury. This study was a prespecified substudy focusing on clinical research engagement, other results from the survey are under submission separately. All survey questions examined in this analysis are listed as part of the complete survey in online supplemental materials S1. The survey was disseminated in English, Spanish, French, and Portuguese via the international collaboration Share-Net, an informal network established and led by academic researchers within the London-based Sexual Health and HIV All East Research Collaborative. The survey was disseminated through newsletters and Twitter feeds of the British Association

for Sexual Health, The British HIV Association, the European AIDS Clinical Society, the International AIDS Society and the research networks of SHARE-net collaborators from 16 countries.

Statistical analysis

We present descriptive statistics comparing individuals who reported involvement with mpox research and those who did not. We did not plan to conduct statistical comparison testing as the intention of this study was to carry out a descriptive study describing prespecified measures using cross-sectional data due to known limitations of small sample sizes especially in subgroups and unknown precise denominator data. We examined demographic characteristics (job title, age, gender, and race and ethnicity), workplace setting, policy and public health agency work, media engagement, research outputs (publications and grants), role within the research process, and impact on other research responsibilities. Race and ethnicity were defined using nine categories including a free text category. Due to small numbers within all subgroups apart from White, we report all other groups for this analysis collectively. We examined differences by geographical location comparing the UK, the EU and the USA. All analyses were performed using R software V4.02. Results are presented as frequency (percentage): n (%).

RESULTS

Of a total 139 respondents from the UK, none identified themselves specifically as clinical researchers. Compared with 210 respondents from the EU of whom 23 (11.0%) identified as clinical researchers (19 consultant physicians, 4 doctors in training) and 58 respondents from the USA of whom 5 (8.6%) identified as clinical researchers (4 consultant physicians, 1 nurse). Summary characteristics of all included survey respondents are detailed in online supplemental materials S2 table S1.

Research involvement among UK clinicians

Among UK clinicians, 21 (15.1%) contributed to mpox research in any capacity either as an independent researcher, collaborator or contributor. Summary statistics of examined characteristics by job title, age, gender, and race and ethnicity are detailed in short form in [table 1](#) and in full in online supplemental materials S2 table S2. Of those who contributed to research, the majority (57.1%) reported that due to mpox research, their other research commitments had been affected negatively. More than half (52.4%) published or submitted any research to a scientific journal, over one-third (38.1%) were asked to be involved with media outlets, however, only one individual (4.8%) obtained grant funding for mpox research. Of those that published or submitted research, the majority (63.6%) collected the data and were named authors, but none were involved in study design.

Overall, the majority of survey respondents were consultant physicians, aged 35–50 years, self-identified as cis-female and White. A comparison of demographic characteristics by research activity is shown in [figure 1](#). Research contribution (Have you contributed to monkeypox research?) was lowest among nurses (4.9% vs 19.5% of consultant physicians and 18.8% of doctors-in-training), those aged >50 years (8.5% vs 19.7% of 35–50 years and 15.4% of <35 years), female respondents (7.1% vs 34.3% of male and 33.3% of non-binary respondents) and those from racially minoritised backgrounds (13.3% vs 15.6% White). In those who were research active, only consultant physicians

Table 1 Short summary of responses to research engagement questions from all UK survey respondents

	Age in years			Gender			Race and ethnicity	
	<35 (n=26)	35–50 (n=66)	>50 (n=47)	Male (n=35)	Female (n=98)	Non-binary (n=6)	White (n=109)	All other groups (n=30)
Have you contributed to monkeypox research?								
Yes	4 (15.4)	13 (19.7)	4 (8.5)	12 (34.3)	7 (7.1)	2 (33.3)	17 (15.6)	4 (13.3)
No	22 (84.6)	53 (80.3)	43 (91.5)	23 (65.7)	91 (92.9)	4 (66.7)	92 (84.4)	7 (23.3)
How would you describe your area of research focus?								
Clinical	4 (15.4)	13 (19.7)	4 (8.5)	11 (31.4)	8 (8.2)	2 (33.3)	17 (15.6)	4 (13.3)
Epidemiology	1 (3.8)	4 (6.1)	0 (0.0)	3 (8.6)	1 (1.0)	1 (16.7)	3 (2.8)	2 (6.7)
Public health	0 (0.0)	4 (6.1)	0 (0.0)	1 (2.9)	3 (3.1)	0 (0.0)	4 (3.7)	0 (0.0)
Basic Science	0 (0.0)	2 (3.0)	1 (2.1)	2 (5.7)	1 (1.0)	0 (0.0)	2 (1.8)	1 (3.3)
Have you been involved with monkeypox policy work?								
Yes	5 (19.2)	24 (36.4)	13 (27.7)	16 (45.7)	24 (24.5)	2 (33.3)	37 (33.9)	5 (16.7)
No	21 (80.8)	42 (63.6)	44 (72.3)	19 (54.3)	70 (71.4)	4 (66.7)	72 (66.1)	25 (83.3)
Did you attend briefing meetings and calls with public health agencies?								
National	0 (0.0)	21 (31.8)	12 (25.5)	12 (34.3)	20 (20.4)	1 (16.7)	28 (25.7)	5 (16.7)
Regional	1 (3.8)	28 (42.4)	21 (44.7)	16 (45.7)	33 (33.7)	1 (16.7)	42 (38.5)	8 (26.7)
Local, for example, your clinic/service facility	20 (76.6)	49 (74.2)	35 (74.5)	29 (82.9)	70 (71.4)	5 (83.3)	84 (77.1)	20 (66.7)
International for example, WHO, European Centre for Disease Prevention and Control (ECDC)	0 (0.0)	2 (3.0)	2 (4.3)	1 (2.9)	3 (3.1)	0 (0.0)	4 (3.7)	0 (0.0)
None	5 (19.2)	11 (16.7)	9 (19.1)	4 (11.4)	20 (20.4)	1 (16.7)	18 (16.5)	7 (23.3)
Contributed to monkeypox research								
	Age in years			Gender			Race and ethnicity	
	<35 (n=4)	35–50 (n=13)	>50 (n=4)	Male (n=12)	Female (n=7)	Non-binary (n=2)	White (n=17)	All other groups (n=4)
How much has your other research been affected as a result of your monkeypox research?								
Not at all	2 (50.0)	4 (30.8)	3 (75.0)	5 (41.7)	4 (57.1)	0 (0.0)	7 (41.2)	2 (50.0)
Suffered slightly	1 (25.0)	6 (46.2)	1 (25.0)	5 (41.7)	2 (28.6)	1 (50.0)	7 (41.2)	1 (25.0)
By a moderate amount	0 (0.0)	1 (7.7)	0 (0.0)	1 (8.3)	0 (0.0)	0 (0.0)	1 (5.9)	0 (0.0)
Considerably suffered	1 (25.0)	2 (15.4)	0 (0.0)	1 (8.3)	1 (14.3)	1 (50.0)	2 (11.8)	1 (25.0)
Have you published or submitted any research to a journal on monkeypox during this outbreak?								
Yes	1 (25.0)	8 (61.5)	2 (50.0)	8 (66.7)	3 (42.9)	0 (0.0)	10 (58.8)	1 (25.0)
No	3 (75.0)	5 (38.5)	2 (50.0)	4 (33.3)	4 (57.1)	2 (100.0)	7 (41.2)	3 (75.0)
Have you obtained grant money for research on monkeypox?								
Yes	0 (0.0)	1 (7.7)	0 (0.0)	1 (8.3)	0 (0.0)	0 (0.0)	1 (5.9)	0 (0.0)
No	4 (0.0)	12 (92.3)	4 (100.0)	11 (91.7)	7 (100.0)	2 (100.0)	16 (94.1)	4 (100.0)
Have you been asked to be involved with any media outlets to do with monkeypox?								
Yes	1 (25.0)	6 (46.2)	1 (25.0)	6 (50.0)	2 (28.6)	0 (0.0)	7 (41.2)	1 (25.0)
No	3 (75.0)	7 (53.8)	3 (75.0)	6 (50.0)	5 (71.4)	2 (100.0)	10 (58.8)	3 (75.0)
Published or submitted any research								
	Age in years			Gender			Race and ethnicity	
	<35 (n=1)	35–50 (n=8)	>50 (n=2)	Men (n=8)	Women (n=3)	Non-binary (n=0)	White (n=10)	All other groups (n=1)
Did you collaborate with colleagues?								
In your own service	0 (0.0)	2 (25.0)	2 (100.0)	3 (37.5)	1 (33.3)	–	4 (40)	0 (0.0)
In your own country	0 (0.0)	2 (25.0)	0 (0.0)	2 (25.0)	0 (0.0)	–	2 (20.0)	0 (0.0)
In your own region	1 (100.0)	1 (12.5)	0 (0.0)	0 (0.0)	2 (66.7)	–	2 (20.0)	0 (0.0)
Globally	0 (0.0)	3 (37.5)	0 (0.0)	3 (37.5)	0 (0.0)	–	2 (20.0)	1 (100.0)
What was your role within the research process?								
Collected data and named author	1 (100.0)	6 (75.0)	0 (0.0)	4 (50.0)	3 (100.0)	–	6 (60.0)	1 (100.0)
Collected data and part of a writing group	0 (0.0)	2 (25.0)	1 (50.0)	3 (37.5)	0 (0.0)	–	3 (30)	0 (0.0)
Collected data only	0 (0.0)	0 (0.0)	1 (50.0)	1 (12.5)	0 (0.0)	–	1 (10)	0 (0.0)
Designed the study	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	–	0 (0.0)	0 (0.0)
Total n=139. Categorised by age, gender, and race and ethnicity. Results presented as n (%). Full summary table including job title and total columns are detailed in online supplemental materials S2 table S2.								

and significantly higher proportions of those aged 35–50 years (61.5% vs 25% <35 years and 50% >50 years), identifying as male (66.7% vs 42.9% female and 0% non-binary) and White (58.8% vs 25% all other race and ethnicity groups) published or submitted their work to a journal. Similarly, the only individual who obtained grant funding identified as a White, male

consultant physicians aged 35–50 years. Individuals within these demographic characteristic groups were also more likely to have engaged with media outlets related to their research.

Individuals who were research active were more likely to work in a university hospital (80%) compared with those that were not research active (47.5%). Greater proportions of research-active

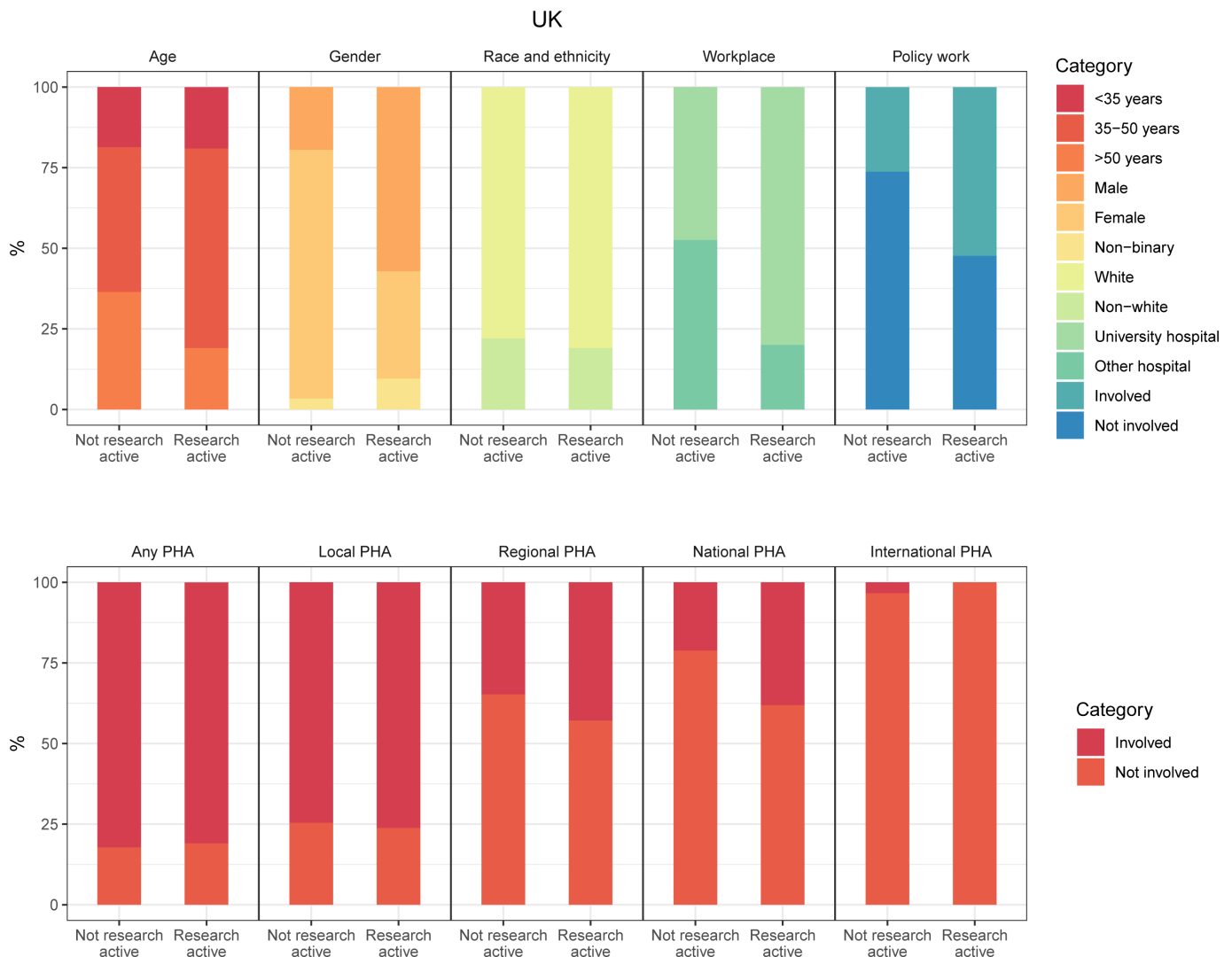


Figure 1 Bar chart comparing research-active and non-research active UK survey participants showing proportions by demographic characteristics, workplace, involvement in policy and public health agency (PHA) work.

survey respondents were involved in policy work (52.4% vs 26.3%). Similar proportions of research active and non-research active respondents had engagement with public health agencies (81.0% vs 82.2%). Most public health agency engagement was at a local level across both groups. By demographics, involvement with both policy work and engagement with public health agencies were highest in those identifying as consultant physicians, aged 35–50 years, male and White compared with all other groups.

Comparison with other geographical regions

Overall research involvement was over two times higher in both the EU (36.7%) and the USA (37.9%) compared with the UK (15.1%). Detailed summary statistics are presented in online supplemental materials S2 table S3 and S4. Compared with the UK, slightly higher proportions of EU clinicians published or submitted their research to a journal (55.8% vs 52.4%) and were asked to engage with the media (41.6% vs 38.1%). Two (2.6%) EU respondents obtained grant funding. Although the lowest proportions of US clinicians published or submitted their research to a journal (27.3%), greater proportions engaged with media outlets (45.5%) and obtained grant funding (18.1%). Research active individuals were more likely to be involved in

study design in the EU (14.0%) and the USA (16.7%) compared with the UK (0%).

Similar to the UK, the majority of survey respondents in both the EU and the USA were consultant-grade equivalents, aged 35–50 years, identified as female and White. However, among those that were research active, less disparity across demographic characteristic groups were seen in both the EU and the USA compared with the UK reflecting greater diversity among research active healthcare professionals (online supplemental figures S1 and S2). Unlike the UK, research activity was higher among doctors-in-training (52.9% EU, 50% USA) and those aged <35 years (56.4%, 50% USA). Higher proportions of racially minoritised respondents (56.2%) engaged in research than White respondents (35.1%) in the EU. More female (42.3%) respondents than male (33.3%) engaged in research in the USA. Similar to the UK, in both the EU and the USA, journal publication or submission, involvement with media outlets and grant funding success were higher among consultant physicians and those aged 35–50 and >50 years. However, there was more equal representation across gender and race and ethnicity for these markers of research achievements, particularly for the EU.

There were greater differences in percentages of individuals who worked in a university hospital between research active and

non-research active individuals in the USA (95.5% vs 30.6%) compared with the EU (80.5% vs 68.4%). In both regions, more research active respondents were also involved in policy work (EU 49.4% vs 29.3%, US 40.9% vs 25%). Similar to the UK, engagement with public health agencies was significantly higher in research active compared with non-research active respondents in the EU (81.8% vs 70.7%) in contrast to the USA (18.2% vs 27.8%). There were greater levels of international public health agency engagement in these regions, particularly in the EU. There was again more equal distribution across demographic characteristic groups in those involved with both policy work and engagement with public health agencies in both the EU and the USA compared with the UK.

DISCUSSION

Our cross-sectional study has examined levels of research engagement within a cohort of clinicians working in sexual health and HIV medicine during the mpox pandemic. Our key findings were that only one in six clinically active healthcare professionals in the UK had any form of research involvement during this acute clinical crisis. This was less than half of those residing in the EU and the USA. In this predominantly (70%) female specialty in the UK, levels of research activity were nonetheless significantly higher in older, White and male consultant grade clinicians compared with all other demographic groups. Measures of research success such as journal publications and obtaining grant funding were also higher for individuals fitting these profiles. Less disparity across demographic characteristic groups were seen in both the EU and the USA compared with the UK reflecting increased diversity among research active clinicians in overall research activity and markers of research achievements (journal submissions/publications and grant funding).

Our findings support that of other studies conducted over the past 5 years including a large multicentre led systematic review and primary qualitative analysis of clinical academics in the UK showing poor recruitment and retention rates.³ Despite a clear need to continue developing clinical academics, these issues have been overlooked as a priority due to economic pressures and increasing clinical backlogs.⁶ However, continuing this approach is short-sighted as research insights and innovations can support the healthcare system by making it more efficient and help address its current backlog and the other challenges that it faces. This is supported by additional financial benefits such as industry funding and increased recruitment to the medical workforce, and enhanced scientific reputation worldwide for UK scientists and clinicians.¹⁰ There are likely to be multifaceted reasons for low research engagement such as the competing demands of academic and clinical workloads, funding pressures and unclear career progression pathways.³ Unless this trend is reversed, and new ways of increasing the clinical academic workforce are found, the clinical academic workforce is on course for further decline as there are substantially fewer younger clinical academics to replace those who will retire in the next 10 years.²

We also found that despite being a female-dominated specialty,⁹ individuals working in sexual health and HIV medicine who engaged with research were poorly represented by women, people from racially minoritised backgrounds, and younger age groups. This may imply that the factors that known to negatively influence pursuit of academic medicine at earlier stages of training such as lack of mentorship, insufficient job security, delayed career progression and pay may affect women and people from ethnically diverse backgrounds disproportionately.¹¹ Despite an overall increase in women and individuals

from racially minoritised backgrounds entering medical school in recent years, disparities continue to exist with increasing levels of seniority across medicine and within academic medicine specifically.^{12–15} Worryingly, frequently reported reasons for those leaving academic medicine include discrimination and differential opportunities within both the academic and clinical environments.³ Only 31% of clinical academics are women and female academics receive only 28% of research funding.^{16 17} Eighty-two per cent of clinical academics identify as White and researchers from racially minoritised groups are less likely to receive research funding.¹⁸ In addition, maternity status and unequal distribution of labour at home were highlighted as barriers during the COVID-19 pandemic leading to disparities in research activity and publications.^{19–21} Although we observed greater levels of research engagement and diversity in the clinical academic workforce in the EU and USA, the USA in particular report disparities for women and racially minoritised groups for similar reasons as for the UK.^{22–24}

Part of pandemic preparedness is establishing and strengthening academic links with hospitals and early identification of research opportunities. In this study, we observed high levels of engagement with policy generation and public health agencies—markers of clinical seniority. Yet despite the overall high percentage of clinicians working in university hospital environments, it appears that opportunities to link with frontline clinicians working at high levels to produce research were missed. Three to five months into the mpox pandemic, few research-active individuals reported research outputs and had obtained grant funding in a rapidly evolving situation where both funding calls and fast-track publications were occurring. This highlights the need to find better ways of supporting clinicians who are and who may wish to be engaged with research. Pertinent to the UK situation, a number of wide-ranging recommendations were made following the recent parliamentary inquiry into clinical academics in the NHS led by Baroness Brown of Cambridge.⁶ Recommendations to funding bodies are to improve career precarity of early career clinical academics by extending contracts. Recommendations for the government are extensive and include mitigations around pay, pension contributions and other conditions. Recommendations to hospitals focus on the importance of academic mentorship. This is particularly challenging in non-university hospital environments and for people from racially minoritised backgrounds for whom few role-models exist. Recommendations to NHS trusts and hospitals are to meet the statutory commitment for consultant physicians to spend 25% of their time on non-clinical work such as research. Ultimately, annual research performance metrics should be devised and reported on annually by integrated care boards to the Department of Health and Social Care. As highlighted by previous studies, these multifaceted future interventions including those intended to address inequities, require careful evaluation to determine their usefulness.^{25–27} Additionally, the involvement of junior academic staff and staff with protected characteristics in codeveloping the evaluation of these future interventions is vital.

Strengths and limitations

This study confirms and adds to the body of evidence to support the declining clinical academic workforce and lack of diversity overall in the UK. It has the added strength of being able to assess a well-defined clinical workforce cohort during a distinct time period to better characterise factors in research engagement while reducing potential confounders such as differences

in opportunities across different medical specialties. Our study sample captured around one-third of the overall sexual health and HIV medicine specialty in the UK and reflect the characteristics of the baseline population.⁹ However, within subgroups, there were relatively few participants which limited our ability to assess intersectionality. Furthermore, this was a self-completed survey which may have introduced a degree of possible selection bias in participants. To our knowledge, this is the first empirical study to assess research activity during the mpox pandemic. Nevertheless, our survey was not primarily designed to look at contribution to clinical research but afforded the opportunity to do so as part of the overall mpox response. As the survey was designed to be as widely applicable to an international audience as possible, we did not include specific questions about employment status such as employment as a clinical academic versus full-time NHS employee with an honorary academic contract. More in-depth assessment of clinical academic status and individual research environments such as time in job plans reserved for research and support provided is difficult to gauge and require a more detailed targeted survey with specific questions. Additionally, some research and grant calls may have become available after the study period, and therefore, not captured within our analysis. We aimed to quantify and objectively assess demographic and environmental factors. However, more qualitative approaches are needed to explore personal experiences in order to better understanding individual barriers and facilitators associated with undertaking research.

CONCLUSIONS

During the mpox pandemic, both rates of overall self-reported research engagement and diversity among research-active clinicians were significantly lower in the UK compared with both the EU and the USA. Reduced engagement with clinical research was especially noticeable in at earlier stages of training, in women, and those from racially minoritised groups. Adherence to and evaluation of existing UK-based recommendations to improve the clinical academic pipeline are needed to increase research engagement and diversity to safeguard UK clinical research in future. Additionally, particular attention needs to be paid to the ongoing disparities in research engagement with respect to age, gender and race and ethnicity in the UK to safeguard clinical research in the future. Engaging a diverse group of junior clinical academics and research-active clinicians within the NHS not yet on an academic pathway in designing the evaluation of parliamentary recommendations is needed. More research into the barriers and facilitators in people with protected characteristics is needed to better understand the structural barriers to clinical research and to provide more equitable conditions for all clinicians and improve overall recruitment and retention of clinical academics.

Twitter Yize I Wan @YizeWan and Chloe M Orkin @profchloeorkin

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Contributors YIW and CMO both conceptualised this work and developed the initial draft and act as guarantor. MS, RMP, SP and VJA provided critical insight, revised and approved the final manuscript.

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Competing interests YIW, MS, RMP and SP declare no conflict of interest. CMO has no COI related to mpox. She is a recipient of honoraria and research grants from Gilead Sciences, ViiV, GSK, MSD, Janssen, AstraZeneca; National roles include BHIVA Chair (2016–2019), MWF President (2021–2023), Co-Chair of HIV Glasgow International AIDS conference (2022-); International role(s) include member of

International AIDS Society governing council (2019-). VJA has received speaker's fees from ViiV, MSD and Gilead Sciences.

Patient consent for publication Not applicable.

Ethics approval The survey was administered via a survey platform compliant with general data protection regulations (SMART Survey LTD, Tewkesbury, UK) and received ethical approval from the Queen Mary University of London Ethics of Research Committee (QMERC22.297, 27 September 2022). The survey opening page contained information about the aims of the study and custodianship and use of study data. The survey was piloted by 10 sexual health clinicians. By clicking 'continue' and commencing the survey, individuals were considered to have given consent. Once the survey was closed, partially responded questionnaires were excluded from analysis.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement Data are available on reasonable request.

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ORCID iDs

Yize I Wan <http://orcid.org/0000-0001-6445-8991>

Sara Paporini <http://orcid.org/0000-0002-1909-2481>

Chloe M Orkin <http://orcid.org/0000-0001-6168-6745>

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HEALTHCARE WORKER EXPERIENCE OF THE MONKEYPOX RESPONSE

Research Questions:

1. What have been the experiences and perceptions of international healthcare workers of the Monkeypox response?
2. What has been the impact of the monkeypox response on international healthcare workers?

Objectives:

- To assess the clinical experience of healthcare workers during the 2022 multi-country outbreak of monkeypox
- To assess the research experience of healthcare workers during the 2022 multi-country outbreak of monkeypox
- To assess the confidence of healthcare workers' knowledge of monkeypox and identify potential knowledge gaps in clinicians working with monkeypox patients
- To assess the safety of healthcare workers during the 2022 multi-country outbreak of monkeypox
- To assess the preparedness of healthcare workers for the 2022 multi-country outbreak of monkeypox

EXPERIENCES AND PERCEPTIONS OF HEALTHCARE WORKERS OF THE MONKEYPOX RESPONSE: AN INTERNATIONAL SURVEY

SURVEY INFORMATION AND INSTRUCTIONS

You are being invited to complete an anonymous research survey. The survey asks for your opinions and feelings about the current multi-country outbreak of monkeypox, and the impact on you as a healthcare worker. It will take about 15 minutes to complete.

If you do not wish to answer a question, please answer "Prefer not to say". The survey is completely anonymous – we will not ask your personal details and we cannot work out who you are by your answers. You should only take part in this research survey if you are over the age of 18.

The survey is being undertaken by: [SHARE collaborative \(Queen Mary University of London\)](#)

Key points:

- Your participation in this survey is entirely voluntary
- You may withdraw at any point during the survey by closing the survey tab
- Please note, once you have filled in the survey you will not be able to withdraw your data as we will not know it was you who completed it

- If you choose to complete this anonymous survey, the information you provide will be analysed by researchers at Queen Mary University of London (QMUL) and used to inform public health responses to new epidemics like monkeypox in the future
- Your answers will be treated confidentially, and the information you provide will not allow you to be identified in any research outputs/publications
- Data from your answers will be held securely in the QMUL data 'Safe Haven' (a secure data repository) for 5 years
- Results may be published in social media, reports and journals, or presented at conferences

If you have any concerns about the manner in which the study was conducted, please contact the researcher(s) responsible for the study, Dr Vanessa Apea, at: v.apea@qmul.ac.uk.

If you have a complaint which you feel you cannot discuss with the researchers, please contact the QMUL Research Ethics team by e-mail: research-ethics@qmul.ac.uk, providing details of the study, the QMERC reference number (where possible) and details of your complaint.

If you have concerns about monkeypox symptoms, , you can find further information at <https://www.who.int/news-room/fact-sheets/detail/monkeypox>.

Queen Mary Ethics of Research Committee reference number: QMERC

If you agree to continue and for us to use the information from this survey, please click on NEXT PAGE button below:

SECTION 1: CLINICAL ROLE AND SETTING

1. **Have you been involved with monkeypox clinical work, e.g. diagnosing and treating monkeypox patients and/or their contacts?**
 - Yes
 - No
 - Missing

2. **Have you been involved with monkeypox research in any capacity, e.g. independent researcher, collaborator, contributor?**
 - Yes
 - No
 - Missing

3. **Have you been involved with monkeypox policy work, e.g. guideline writing/ national committees/giving informational talks/writing lay summaries?**
 - Yes
 - No

If no to questions 1 end survey

4. **What best describes your current role? Please select all that apply.**
 - Doctor in training
 - General practitioner/family physician/internist
 - Sexual Health or HIV physician
 - Infectious Diseases physician
 - Coloproctologist/Colo-rectal surgeon
 - Dermatologist
 - Paediatrician
 - Obstetrician/gynaecologist
 - Nurse or nurse practitioner
 - Physician's assistant
 - Counsellor/psychologist
 - Health promotion worker
 - Clinical researcher

5. **Do you work at a hospital that is attached to a university?**
 - Yes
 - No
 - Missing

6. **Where did you see suspected or confirmed clinical cases of monkeypox? Please select all that apply.**
 - Sexual health clinic (community, public, private)
 - Infectious disease clinic
 - Emergency department

- HIV clinic
- Dermatology clinic
- General practice
- Rural practice
- In-patient ward
- Obstetrics/Gynaecology clinic or ward
- Paediatric clinic or ward
- Other [\[please specify\]](#)

SECTION 2: CLINICAL WORK

7. During the first four weeks since the first case in your country, on average, what percentage of your work time was focussed on the monkeypox response?
- Up to 25%
 - Up to 50%
 - Up to 75%
 - More than 75%
8. After the first four weeks since the first case in your country, on average, what percentage of your work time was focussed on the monkeypox response?
- Up to 25%
 - Up to 50%
 - Up to 75%
 - More than 75%
9. What tasks have carried out as part of your clinical work? Please tick all that apply
- Direct patient care (diagnosis/testing/symptom management/vaccination)
 - Contacting monkeypox patients or their contacts yourself
 - Developing local protocols/operational guidance for your clinic/service
 - Procuring treatment (tecovirimat) for your patients
 - Setting up or working at monkeypox vaccine services
 - Providing data to public health agencies
 - Education
 - Other [\[please specify\]](#)
10. Has your clinic/service removed other clinical responsibilities to allow you to focus on monkeypox related work
- Yes
 - No
11. During the outbreak of monkeypox did you work?
- Longer hours
 - Same hours
 - Shorter hours

12. Which clinical guidelines did your clinic/service follow during the monkeypox outbreak?

Please tick all that apply

- Clinic/local service guidelines
- National guidelines
- International guidelines e.g. ECDC, WHO, CDC
- Guidelines from an infectious disease/sexual health/dermatology society (e.g. IDSA, HIVMA, EACS, BASHH, BHIVA, ASHM, SPILF)
- Own experience

13. How would you rate your knowledge of how to recognise monkeypox before the outbreak? Please choose the best fit.

- Had never heard of it
- Knew where it occurred but not how to recognise it
- Knew where it occurred and how to recognise it
- Knew where it occurred how to recognise and how to manage it
- Have seen and treated a case before prior to this outbreak
- Have seen many cases prior to this outbreak

14. How confident did you feel managing suspected or confirmed clinical cases of monkeypox at the beginning of the outbreak?

- Not at all confident
- A little bit confident
- Fairly confident
- Very confident
- Extremely confident

15. Did you misdiagnose anyone with a monkeypox related rash for other conditions initially?

- Yes
- No

If yes – Go to question 16

If no – Go to question 17

16. If yes - what conditions did you misdiagnose monkeypox as? Please tick all that apply.

- Chickenpox
- Disseminated Gonorrhoea
- Syphilis
- Herpes
- Impetigo
- Drug-induced reaction
- Hand, Foot and Mouth Disease
- Molluscum contagiosum

- Anal fissure
- Haemorrhoids
- Anal fistula
- Other [please specify]

17. How confident do you feel recognising and treating monkeypox now?

- Not at all confident
- A little bit confident
- Fairly confident
- Very confident
- Extremely confident

18. In your opinion, what quality of care do you think your service has provided to monkeypox patients admitted as in-patient?

- Extremely poor
- Poor
- Average
- Good
- Excellent
- Don't know
- No cases so far

19. In your opinion, what quality of care do you think your service has provided to monkeypox patients managed as an out-patient/in the community?

- Extremely poor
- Poor
- Average
- Good
- Excellent
- Don't know
- No cases so far

20. Did you have meetings/ward rounds with colleagues in your clinic/service to share information and knowledge about monkeypox?

- Yes
- No

21. Did you form clinical networks with institutions across your region to share information and knowledge about Monkeypox?

- Yes
- No

22. In the first four weeks of the outbreak in your country, on average, how many hours a week did you spend on calls or meetings about monkeypox?

- 0
- 1-2

- 3-5
- 6-10
- >10

23. In the first four weeks of the outbreak in your country, were you expected to attend briefing meetings/calls about monkeypox with any of the following groups? Please tick all that apply.

- National public health agency
- Regional public health agency
- Your clinic/service facility
- International public health agency, e.g. WHO, ECDC
- Was not expected to attend table + barchart

24. In the first four weeks of the outbreak in your country, how many hours per week were you personally spending on providing data to public health agencies?

- <1 hour
- <2 hours
- 2-4
- 4-6
- >6 hours

SECTION 3: SAFETY AT WORK

25. How safe have you felt managing suspected or confirmed clinical cases of Monkeypox?

- Not at all safe
- A little bit safe
- Slightly safe
- Very safe
- Extremely safe

26. Did your clinic/service perform a risk assessment of your clinic to ensure staff safety whilst dealing with suspected or confirmed clinical cases of monkeypox?

- Yes
- No

27. What kind of PPE (Personal Protective Equipment) does your clinic/service recommend when assessing a patient with monkeypox? Please tick all that apply.

- Disposable long-sleeved gowns
- Disposable water-resistant aprons
- Disposable gloves
- Disposable shoes or boot covers
- Respiratory protection – Surgical mask
- Respiratory protection - Filtering Face Piece Type 3 – with no fit testing completed
- Respiratory protection - Filtering Face Piece Type 3 – with fit testing completed
- Respiratory protection – N95 mask – with no fit testing completed
- Respiratory protection – N95 mask – with fit testing completed

- Eye splash protection (google or visor)
- Other [please specify]

28. Overall, how would you describe PPE availability at your clinic/service?

- PPE is always available
- PPE is mostly available
- PPE is generally available
- PPE is sometimes available
- PPE is rarely available

29. Did you receive training on how to appropriately put on or take off PPE?

- Yes
- No

30. Did your service's PPE guidance change during the course of the monkeypox response?

- Yes
- No

If yes – Go to question 31

If no – Go to question 32

31. If yes - In your opinion, were these changes communicated in a clear and timely manner?

- Yes
- No

32. What other resources were you provided with as part of your clinic/service's Monkeypox response? Please select all that apply.

- Laboratory diagnostics and sequencing
- Test kits for lesions
- Vaccinations
- Antiviral drugs (e.g. tecovirimat)
- Disinfectants
- Deep cleaning of equipment
- Other [please specify]

33. How do you rate the adequacy of the infection control precautions for monkeypox within your clinical service?

- Entirely adequate
- Mostly adequate
- Somewhat adequate
- Slightly adequate
- Not at all adequate

34. How at risk do you feel of contracting monkeypox?

- Not at all at risk

- Slightly at risk
- Somewhat at risk
- Moderately at risk
- Extremely at risk

35. How concerned are you about the risk to your family members/support network of contracting monkeypox?

- Not at all concerned
- Slightly concerned
- Somewhat concerned
- Moderately concerned
- Extremely concerned

36. Did you contract monkeypox?

- Yes
- No

37. Did any of your colleagues get monkeypox?

- Yes
- No

If yes – Go to question 38

If no – Go to question 39

38. If yes - how many?

- 1-5
- 6-10
- 11-15
- 16-20
- 20+

39. Did any of your family members living in your household get monkeypox?

- Yes
- No

SECTION 4: MONKEYPOX VACCINATION

40. Have you had a smallpox vaccine before this current multi-country outbreak of monkeypox?

- Yes
- No
- Not sure

41. Have you been offered a smallpox vaccine (either ACAM2000® and JYNNEOS™) as vaccination for monkeypox?

- Yes
- No

If yes – Go to question 42

If no – Go to question 45

42. If yes, have you accepted the offer and received the vaccine?

- Yes
- No

43. Was the process to receive the vaccine straightforward and clear?

- Yes
- No

44. Do you feel you received the vaccine in a timely and equitable manner?

- Yes
- No
- Don't know

45. If you have not been offered a vaccine for monkeypox, would you like one?

- Yes
- No
- Don't know

46. Do you think we should be offering vaccination for monkeypox for all healthcare professionals caring for managing suspected or confirmed clinical cases of Monkeypox?

- Yes
- No
- Don't know

47. Do you think we should be offering vaccination for monkeypox for the people at high risk of monkeypox infection prior to exposure, i.e. pre-exposure prophylaxis?

- Yes
- No
- Don't know

48. Is vaccination occurring for all people at high risk prior to exposure occurring in your country?

- Yes
- No
- Don't know

49. In your opinion, do you think access to vaccine for monkeypox adequate in your country?

- Entirely adequate
- Mostly adequate

- Somewhat adequate
- Slightly adequate
- Not at all adequate
- Not applicable as there is no access

SECTION 5: PREPAREDNESS

50. How prepared were you (personally) for the monkeypox outbreak?

- Not at all prepared
- Slightly prepared
- Somewhat prepared
- Moderately prepared
- Extremely prepared

51. In your opinion, has your institution provided clear, timely and authoritative information about monkeypox?

- Strongly agree
- Agree
- Neutral/Neither agree nor disagree
- Disagree
- Strongly agree

52. Have you completed any general outbreak management education and training?

- Yes
- No

53. Have you received specific education, training or instruction about monkeypox within your facility?

- Yes
- No

If yes – Go to question 54

If no – Go to question 56

54. Did your hospital arrange education, training or instruction? Please select all that apply.

- In-house practice education
- Lectures, webinars presentations
- Practical Personal Protective Equipment instruction
- Written guidance
- Other [\[please specify\]](#)

55. How do you rate the adequacy of this education, training, or instruction?

- Entirely adequate
- Mostly adequate
- Somewhat adequate
- Slightly adequate

- Not at all adequate

56. How satisfied were you with the support that your clinic/service received from your national public health agency, and why?

- Not at all at risk
- Slightly at risk
- Somewhat at risk
- Moderately at risk
- Extremely at risk

Why? _____

SECTION 6: WELLBEING

57. Have you experienced any of the following symptoms due to your work on monkeypox? (This includes both/either clinical and research work) Please tick all that apply.

- Fatigue
- Stress
- Anxiety
- Emotional distress
- Depression
- Other [please specify]

58. Did you experience any of the following symptoms prior to your work on monkeypox? (This includes both/either clinical and research work) Please tick all that apply

- Fatigue
- Stress
- Anxiety
- Emotional distress
- Depression
- Other [please specify]

59. Are your family members/those living with you concerned that you are interacting with/caring for suspected or confirmed clinical cases of monkeypox?

- Not at all concerned
- Slightly concerned
- Somewhat concerned
- Moderately concerned
- Extremely concerned

60. How close do you feel to 'burnout' (a state of physical and emotional exhaustion) due to your work on monkeypox? (This includes both/either clinical and research work)
- Not at all
 - Slight feelings of burnout
 - Moderate feelings of burnout
 - Considerably burnt out
 - Completely burnt out
61. How close did you feel to 'burnout' (a state of physical and emotional exhaustion) prior to your work on monkeypox? (This includes both/either clinical and research work)
- Not at all
 - Slight feelings of burnout
 - Moderate feelings of burnout
 - Considerably burnt out
 - Completely burnt out
62. During the past 2 years, have you provided clinical care to COVID patients?
- Yes
 - No
63. Have you heard of the term 'moral distress' before? / Have you heard of the term 'moral injury' before?
- Yes
 - No

Provide definition:

Moral distress is defined as the psychological unease generated where professionals identify an ethically correct action to take but are constrained in their ability to take that action. Even without an understanding of the morally correct action, moral distress can arise from the sense of a moral transgression. More simply, it is the feeling of unease stemming from situations where institutionally required behaviour does not align with moral principles. This can be as a result of a lack of power or agency, or structural limitations, such as insufficient staff, resources, training or time. The individual suffering from moral distress need not be the one who has acted or failed to act; moral distress can be caused by witnessing moral transgressions by others.

Moral injury can arise where sustained moral distress leads to impaired function or longer-term psychological harm. Moral injury can produce profound guilt and shame, and in some cases also a sense of betrayal, anger and profound 'moral disorientation'. It has also been linked to severe mental health issues.

64. Does the term moral distress resonate with your experiences at work managing suspected or confirmed clinical cases of monkeypox?
- Does not resonate at all

- Slightly resonates
- Somewhat resonates
- Moderately resonates
- Extremely resonates

65. Does the term moral injury resonate with your experiences at work managing suspected or confirmed clinical cases of monkeypox?

- Does not resonate at all
- Slightly resonates
- Somewhat resonates
- Moderately resonates
- Extremely resonates

66. During the COVID pandemic, have you experienced moral distress/injury in relation to your ability to provide care?

- Yes
- No

Please describe

67. During the monkeypox response, have you experienced moral distress/injury in relation to your ability to provide care?

- Yes
- No

Please describe

68. Thinking specifically about the 12 months before the COVID-19 pandemic (i.e. the year prior to March 2020), did you have experience of moral distress/injury at work?

- Yes
- No

Please describe

69. Has experiencing the Monkeypox outbreak, in addition to the COVID pandemic, made you more or less likely to remain in health as a profession?

- No change to intent to remain
- More likely to remain
- Less likely to remain
- No change to intent to leave

SECTION 7: MONKEYPOX RESEARCH

70. Have you contributed to monkeypox research

- Yes

- No

If yes – go to question 71

If no – the rest of the questions don't appear go to

71. How would you describe your area of research focus? (tick all that apply)

- Clinical
- Epidemiology
- Public health
- Basic Science

72. How much has your other research been affected as a result of your monkeypox research?

- Not at all
- Suffered slightly
- By a moderate amount
- Considerably suffered
- Extremely suffered

73. Have you published or submitted any research to a journal on monkeypox during this outbreak?

- Yes
- No

If yes – go to question 74

If no – go to question 76

74. If yes: Did you collaborate with colleagues?

- In your own clinic/service
- In your own region
- In your own country
- With global collaborators

75. What was your role within the research process?

- Designed the study
- Collected Data only
- Collected data and was a named author
- Collected data and was part of a writing group

76. Have you obtained grant money for research on monkeypox?

- Yes
- No
- Have applied but have not heard yet

77. Have you been asked to be involved with any media outlets to do with monkeypox?

- Yes

- No

If yes – go to question 78

If no – go to question 79

78. If yes, have you had training?

- No training at all
- Very little training
- Some training
- A fair amount of training
- A lot of training

79. If no, have other colleagues from your service/clinic been asked to engage with the media?

- Yes
- No

SECTION 8: DEMOGRAPHICS

80. Age:

- 18-25
- 26-30
- 31-34
- 35-40
- 41-50
- 51-60
- 60+

81. Gender:

- Cis-Male
- Cis-Female
- Transmale
- Transfemale
- Non-binary/non-conforming
- Prefer not to say

82. Sexuality: Do you identify as gay or a bisexual man who has sex with men?

- Yes
- No
- Prefer not to say

83. WHO region of residence: (associated countries will be defined)

- European Region
- Region of the Americas
- South-East Asian Region
- African Region

- Eastern Mediterranean Region
- Western Pacific region
- Prefer not to say

84. Please select country you are working in

85. Ethnicity:

- White/Caucasian
- Black/African American
- Asian/Asian American
- Latinx or Hispanic
- American Indian or Alaska Native
- Middle Eastern or North African
- Native Hawaiian
- Other Pacific Islander
- Mixed or Multiple Ethnic Group
- Other Ethnic Group [\[please specify\]](#)

86. Do you hold any of the following degrees? Please tick all that apply.

- Medical Degree (MD or equivalent)
- MSc
- MPH
- PhD
- Other [\[please specify\]](#)

SECTION 9: ANY ADDITIONAL COMMENTS?

87. Any further comments?

'Text box should have a maximum of 250 words'

'THANK YOU' PAGE

Thank you for taking time to take part in our survey and sharing your views. We are grateful for your participation.

IF YOU HAVE ANY FURTHER QUESTIONS ABOUT THIS SURVEY OR IF YOU WOULD LIKE TO TAKE PART IN FUTURE RESEARCH WITH OUR TEAM, PLEASE CONTACT US AT:

shareresearch@qmul.ac.uk.

Table S1. Characteristics of all included survey respondents. Results presented as n (%). AHP: allied health professional.

	UK (n=139)	EU (n=210)	US (n=58)	Total (n=407)
<i>Job title</i>				
Consultant	82 (59.0)	178 (84.8)	40 (69.0)	300 (73.7)
Doctor-in-training	16 (11.5)	17 (8.1)	2 (3.4)	35 (8.6)
Nurse or AHP	41 (29.5)	15 (7.1)	16 (27.6)	72 (17.7)
<i>Age in years</i>				
<35	26 (18.7)	39 (18.6)	8 (13.8)	73 (17.9)
35-50	66 (47.5)	105 (50.0)	23 (39.7)	194 (47.7)
>50	47 (33.8)	66 (31.4)	27 (46.6)	140 (34.4)
<i>Gender</i>				
Male	35 (25.2)	100 (47.6)	27 (46.6)	162 (39.8)
Female	98 (70.5)	106 (50.5)	30 (51.7)	234 (57.5)
Non-binary	6 (4.3)	4 (1.9)	1 (1.7)	22 (2.7)
<i>Ethnicity</i>				
White	109 (78.4)	194 (92.3)	38 (65.5)	341 (83.8)
All other groups	30 (21.6)	16 (7.6)	20 (34.5)	66 (16.2)

Table S2. Summary of responses to research engagement questions from all UK survey respondents. Results presented as n (%). AHP: allied health professional.

	Job title			Age in years			Gender			Ethnicity		Total (n=139)
	Consultant (n=82)	Doctor-in-training (n=16)	Nurse or AHP (n=41)	<35 (n=26)	35-50 (n=66)	>50 (n=47)	Male (n=35)	Female (n=98)	Non-binary (n=6)	White (n=109)	All other groups (n=30)	
<i>Have you contributed to monkeypox research?</i>												
Yes	16 (19.5)	3 (18.8)	2 (4.9)	4 (15.4)	13 (19.7)	4 (8.5)	12 (34.3)	7 (7.1)	2 (33.3)	17 (15.6)	4 (13.3)	21 (15.1)
No	66 (80.5)	13 (81.2)	39 (95.1)	22 (84.6)	53 (80.3)	43 (91.5)	23 (65.7)	91 (92.9)	4 (66.7)	92 (84.4)	7 (23.3)	118 (84.9)
<i>How would you describe your area of research focus?</i>												
Clinical	18 (22.0)	3 (18.8)	0 (0.0)	4 (15.4)	13 (19.7)	4 (8.5)	11 (31.4)	8 (8.2)	2 (33.3)	17 (15.6)	4 (13.3)	21 (15.1)
Epidemiology	4 (4.9)	1 (6.2)	0 (0.0)	1 (3.8)	4 (6.1)	0 (0.0)	3 (8.6)	1 (1.0)	1 (16.7)	3 (2.8)	2 (6.7)	5 (3.6)
Public health	2 (2.4)	0 (0.0)	2 (4.9)	0 (0.0)	4 (6.1)	0 (0.0)	1 (2.9)	3 (3.1)	0 (0.0)	4 (3.7)	0 (0.0)	4 (2.9)
Basic Science	1 (1.2)	0 (0.0)	2 (4.9)	0 (0.0)	2 (3.0)	1 (2.1)	2 (5.7)	1 (1.0)	0 (0.0)	2 (1.8)	1 (3.3)	3 (2.2)
<i>Have you been involved with monkeypox policy work?</i>												
Yes	29 (35.4)	4 (25.0)	9 (22)	5 (19.2)	24 (36.4)	13 (27.7)	16 (45.7)	24 (24.5)	2 (33.3)	37 (33.9)	5 (16.7)	42 (30.2)
No	53 (64.6)	12 (75.0)	32 (78)	21 (80.8)	42 (63.6)	44 (72.3)	19 (54.3)	70 (71.4)	4 (66.7)	72 (66.1)	25 (83.3)	97 (69.8)
<i>Did you attend briefing meetings and calls with public health agencies?</i>												
National	26 (31.7)	1 (6.2)	6 (14.6)	0 (0.0)	21 (31.8)	12 (25.5)	12 (34.3)	20 (20.4)	1 (16.7)	28 (25.7)	5 (16.7)	22 (23.7)
Regional	43 (52.4)	0 (0.0)	7 (17.1)	1 (3.8)	28 (42.4)	21 (44.7)	16 (45.7)	33 (33.7)	1 (16.7)	42 (38.5)	8 (26.7)	50 (36.0)
Local e.g. your clinic/service facility	65 (79.3)	9 (56.2)	30 (73.2)	20 (76.6)	49 (74.2)	35 (74.5)	29 (82.9)	70 (71.4)	5 (83.3)	84 (77.1)	20 (66.7)	104 (74.8)
International e.g. WHO, ECDC	3 (3.7)	0 (0.0)	1 (2.4)	0 (0.0)	2 (3.0)	2 (4.3)	1 (2.9)	3 (3.1)	0 (0.0)	4 (3.7)	0 (0.0)	4 (2.9)
None	9 (11.0)	7 (43.8)	9 (22.0)	5 (19.2)	11 (16.7)	9 (19.1)	4 (11.4)	20 (20.4)	1 (16.7)	18 (16.5)	7 (23.3)	25 (18.0)
<i>Contributed to monkeypox research</i>												
	Job title	Age in years			Gender			Ethnicity		Total (n=21)		
	Consultant (n=16)	Doctor-in-training (n=3)	Nurse or AHP (n=2)	<35 (n=4)	35-50 (n=13)	>50 (n=4)	Male (n=12)	Female (n=7)	Non-binary (n=2)	White (n=17)	All other groups (n=4)	
<i>How much has your other research been affected as a result of your monkeypox research?</i>												
Not at all	7 (43.8)	1 (33.3)	1 (50.0)	2 (50.0)	4 (30.8)	3 (75.0)	5 (41.7)	4 (57.1)	0 (0.0)	7 (41.2)	2 (50.0)	9 (42.9)
Suffered slightly	6 (37.5)	1 (33.3)	1 (50.0)	1 (25.0)	6 (46.2)	1 (25.0)	5 (41.7)	2 (28.6)	1 (50.0)	7 (41.2)	1 (25.0)	8 (38.1)
By a moderate amount	1 (6.3)	0 (0.0)	0 (0.0)	0 (0.0)	1 (7.7)	0 (0.0)	1 (8.3)	0 (0.0)	0 (0.0)	1 (5.9)	0 (0.0)	1 (4.8)
Considerably suffered	2 (12.5)	1 (33.3)	0 (0.0)	1 (25.0)	2 (15.4)	0 (0.0)	1 (8.3)	1 (14.3)	1 (50.0)	2 (11.8)	1 (25.0)	3 (14.3)
<i>Have you published or submitted any research to a journal on monkeypox during this outbreak?</i>												
Yes	10 (62.5)	0 (0.0)	1 (50.0)	1 (25.0)	8 (61.5)	2 (50.0)	8 (66.7)	3 (42.9)	0 (0.0)	10 (58.8)	1 (25.0)	11 (52.4)
No	6 (37.5)	3 (100.0)	1 (50.0)	3 (75.0)	5 (38.5)	2 (50.0)	4 (33.3)	4 (57.1)	2 (100.0)	7 (41.2)	3 (75.0)	10 (47.6)
<i>Have you obtained grant money for research on monkeypox?</i>												
Yes	1 (6.3)	0 (0.0)	0 (0.0)	0 (0.0)	1 (7.7)	0 (0.0)	1 (8.3)	0 (0.0)	0 (0.0)	1 (5.9)	0 (0.0)	1 (4.8)
No	15 (93.8)	3 (100.0)	2 (100.0)	4 (0.0)	12 (92.3)	4 (100.0)	11 (91.7)	7 (100.0)	2 (100.0)	16 (94.1)	4 (100.0)	20 (95.2)
<i>Have you been asked to be involved with any media outlets to do with monkeypox?</i>												
Yes	8 (50.0)	0 (0.0)	0 (0.0)	1 (25.0)	6 (46.2)	1 (25.0)	6 (50.0)	2 (28.6)	0 (0.0)	7 (41.2)	1 (25.0)	8 (38.1)
No	8 (50.0)	3 (100.0)	2 (100.0)	3 (75.0)	7 (53.8)	3 (75.0)	6 (50.0)	5 (71.4)	2 (100.0)	10 (58.8)	3 (75.0)	13 (61.9)
<i>Published or submitted any research</i>												
	Job title	Age in years			Gender			Ethnicity		Total (n=11)		
	Consultant (n=10)	Doctor-in-training (n=0)	Nurse or AHP (n=1)	<35 (n=1)	35-50 (n=8)	>50 (n=2)	Men (n=8)	Women (n=3)	Non-binary (n=0)	White (n=10)	All other groups (n=1)	
<i>Did you collaborate with colleagues?</i>												
In your own service	4 (40)	-	0 (0.0)	0 (0.0)	2 (25.0)	2 (100.0)	3 (37.5)	1 (33.3)	-	4 (40)	0 (0.0)	4 (36.4)

In your own country	2 (20.0)	-	0 (0.0)	0 (0.0)	2 (25.0)	0 (0.0)	2 (25.0)	0 (0.0)	-	2 (20.0)	0 (0.0)	2 (18.2)
In your own region	1 (10)	-	1 (100.0)	1 (100.0)	1 (12.5)	0 (0.0)	0 (0.0)	2 (66.7)	-	2 (20.0)	0 (0.0)	2 (18.2)
Globally	3 (30)	-	0 (0.0)	0 (0.0)	3 (37.5)	0 (0.0)	3 (37.5)	0 (0.0)	-	2 (20.0)	1 (100.0)	3 (27.3)
<i>What was your role within the research process?</i>												
Collected data and named author	6 (60.0)	-	1 (100.0)	1 (100.0)	6 (75.0)	0 (0.0)	4 (50.0)	3 (100.0)	-	6 (60.0)	1 (100.0)	7 (63.6)
Collected data and part of a writing group	3 (30)	-	0 (0.0)	0 (0.0)	2 (25.0)	1 (50.0)	3 (37.5)	0 (0.0)	-	3 (30)	0 (0.0)	3 (27.3)
Collected data only	1 (10)	-	0 (0.0)	0 (0.0)	0 (0.0)	1 (50.0)	1 (12.5)	0 (0.0)	-	1 (10)	0 (0.0)	1 (9.1)
Designed the study	0 (0.0)	-	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	-	0 (0.0)	0 (0.0)	0 (0.0)

Table S3. Summary of responses to research engagement questions from all EU survey respondents. Results presented as n (%). AHP: allied health professional.

	Job title			Age in years			Gender			Ethnicity		Total (n=210)
	Consultant (n=178)	Doctor-in-training (n=17)	Nurse or AHP (n=15)	<35 (n=39)	35-50 (n=105)	>50 (n=66)	Male (n=100)	Female (n=106)	Non-binary (n=4)	White (n=194)	All other groups (n=16)	
<i>Have you contributed to monkeypox research?</i>												
Yes	61 (34.3)	9 (52.9)	7 (46.7)	22 (56.4)	29 (27.6)	26 (39.4)	45 (45)	31 (29.2)	1 (25.0)	68 (35.1)	9 (56.2)	77 (36.7)
No	117 (65.7)	8 (47.1)	8 (53.3)	17 (43.6)	76 (72.4)	40 (60.6)	55 (55)	75 (70.8)	3 (75.0)	126 (64.9)	7 (43.8)	133 (63.3)
<i>How would you describe your area of research focus?</i>												
Clinical	56 (31.5)	9 (52.9)	5 (33.3)	21 (53.8)	25 (23.8)	24 (36.4)	40 (40)	29 (27.4)	1 (25.0)	61 (31.4)	9 (56.2)	70 (33.3)
Epidemiology	25 (14.0)	2 (11.8)	3 (20.0)	8 (20.5)	13 (12.4)	9 (13.6)	22 (22)	8 (7.5)	0 (0.0)	28 (14.4)	2 (12.5)	30 (14.3)
Public health	13 (7.3)	0 (0.0)	1 (6.7)	3 (7.7)	6 (5.7)	5 (7.6)	11 (11)	3 (2.8)	0 (0.0)	12 (6.2)	2 (12.5)	14 (6.7)
Basic Science	4 (2.2)	0 (0.0)	0 (0.0)	1 (2.6)	1 (1.0)	2 (3.0)	3 (3)	1 (0.9)	0 (0.0)	4 (2.1)	0 (0.0)	4 (1.9)
<i>Have you been involved with monkeypox policy work?</i>												
Yes	66 (37.1)	4 (23.5)	7 (46.7)	11 (28.2)	38 (36.2)	28 (42.4)	42 (42)	34 (32.1)	1 (25.0)	72 (37.1)	5 (31.2)	77 (36.7)
No	112 (62.9)	13 (76.5)	8 (53.3)	28 (71.8)	67 (63.8)	38 (57.6)	58 (58)	72 (67.9)	3 (75.0)	122 (62.9)	11 (68.8)	133 (63.3)
<i>Did you attend briefing meetings and calls with public health agencies?</i>												
National	45 (25.3)	2 (11.8)	3 (20.0)	2 (5.1)	29 (27.6)	19 (28.8)	25 (25.0)	23 (21.7)	2 (50.0)	47 (24.2)	3 (18.8)	50 (23.8)
Regional	63 (35.4)	4 (23.5)	1 (6.7)	11 (28.2)	34 (32.4)	23 (34.8)	35 (35.0)	31 (29.2)	2 (50.0)	61 (31.4)	7 (43.8)	68 (32.3)
Local e.g. your clinic/service facility	98 (55.1)	12 (70.6)	9 (60.0)	28 (71.8)	54 (51.4)	37 (56.1)	57 (57.0)	62 (58.5)	0 (0.0)	110 (56.7)	9 (56.2)	119 (56.7)
International e.g. WHO, ECDC	19 (10.7)	0 (0.0)	3 (20.0)	3 (7.7)	12 (11.4)	7 (10.6)	9 (9.0)	12 (11.3)	1 (25.0)	19 (9.8)	3 (18.8)	22 (10.5)
None	46 (25.8)	3 (17.6)	4 (26.7)	6 (15.4)	28 (26.7)	19 (28.8)	23 (23.0)	30 (28.3)	0 (0.0)	51 (26.3)	2 (12.5)	53 (25.2)
<i>Contributed to monkeypox research</i>												
	Job title	Age in years			Gender			Ethnicity		Total (n=77)		
	Consultant (n=61)	Doctor-in-training (n=9)	Nurse or AHP (n=7)	<35 (n=22)	35-50 (n=29)	>50 (n=26)	Male (n=45)	Female (n=31)	Non-binary (n=1)	White (n=68)	All other groups (n=9)	
<i>How much has your other research been affected as a result of your monkeypox research?</i>												
Not at all	16 (26.2)	4 (44.4)	3 (42.9)	8 (36.4)	4 (13.8)	11 (42.3)	15 (33.3)	8 (25.8)	0 (0.0)	22 (32.4)	1 (11.1)	23 (29.9)
Suffered slightly	17 (27.9)	3 (33.3)	3 (42.9)	5 (22.7)	12 (41.4)	6 (23.1)	12 (26.7)	10 (32.3)	1 (100.0)	20 (29.4)	3 (33.3)	23 (29.9)
By a moderate amount	13 (21.3)	2 (22.2)	0 (0.0)	5 (22.7)	5 (17.2)	5 (19.2)	10 (22.2)	5 (16.1)	0 (0.0)	12 (17.6)	3 (33.3)	15 (19.5)
Considerably suffered	13 (21.3)	0 (0.0)	1 (14.3)	4 (18.2)	6 (20.7)	4 (15.4)	7 (15.6)	7 (22.6)	0 (0.0)	12 (17.6)	2 (22.2)	14 (18.2)
Extremely suffered	2 (3.3)	0 (0.0)	0 (0.0)	0 (0.0)	2 (6.9)	0 (0.0)	1 (2.2)	1 (3.2)	0 (0.0)	2 (2.9)	0 (0.0)	2 (2.6)
<i>Have you published or submitted any research to a journal on monkeypox during this outbreak?</i>												
Yes	35 (57.4)	5 (55.6)	3 (42.9)	13 (59.1)	16 (55.2)	14 (53.8)	26 (57.8)	16 (51.6)	1 (100.0)	36 (52.9)	7 (77.8)	43 (55.8)
No	26 (42.6)	4 (44.4)	4 (57.1)	9 (40.9)	13 (44.8)	12 (46.2)	19 (42.2)	15 (48.4)	0 (0.0)	32 (47.1)	2 (22.2)	34 (44.2)
<i>Have you obtained grant money for research on monkeypox?</i>												
Yes	0 (0.0)	1 (11.1)	1 (14.3)	1 (4.5)	1 (3.4)	0 (0.0)	0 (0.0)	1 (3.2)	1 (100.0)	0 (0.0)	2 (22.2)	2 (2.6)
No	57 (93.4)	8 (88.9)	5 (71.4)	20 (90.1)	26 (89.7)	24 (92.3)	44 (97.8)	26 (83.9)	0 (0.0)	63 (92.6)	7 (77.8)	70 (90.9)
Applied but not heard	4 (6.6)	0 (0.0)	1 (14.3)	1 (4.5)	2 (6.9)	2 (3.8)	1 (8.9)	4 (12.9)	0 (0.0)	5 (7.4)	0 (0.0)	5 (6.4)
<i>Have you been asked to be involved with any media outlets to do with monkeypox?</i>												
Yes	28 (45.9)	2 (22.2)	2 (28.6)	5 (22.7)	18 (62.1)	9 (34.6)	22 (48.9)	9 (29.0)	1 (100.0)	28 (41.2)	4 (44.4)	32 (41.6)
No	33 (54.1)	7 (77.8)	5 (71.4)	17 (77.3)	11 (37.9)	17 (65.4)	23 (51.1)	22 (71.0)	0 (0.0)	40 (58.8)	5 (55.6)	45 (58.4)
<i>Published or submitted any research</i>												
	Job title	Age in years			Gender			Ethnicity		Total (n=43)		
	Consultant (n=35)	Doctor-in-training (n=5)	Nurse or AHP (n=3)	<35 (n=13)	35-50 (n=16)	>50 (n=14)	Men (n=26)	Women (n=16)	Non-binary (n=1)	White (n=36)	All other groups (n=7)	

<i>Did you collaborate with colleagues?</i>												
In your own service	11 (31.4)	2 (40.0)	2 (66.7)	6 (46.2)	6 (37.5)	3 (21.4)	9 (34.6)	6 (37.5)	0 (0.0)	11 (30.6)	4 (57.1)	15 (34.8)
In your own country	12 (34.3)	0 (0.0)	1 (33.3)	3 (23.1)	4 (25.0)	6 (42.9)	7 (26.9)	6 (37.5)	0 (0.0)	12 (33.3)	1 (14.3)	13 (30.2)
In your own region	4 (11.4)	3 (60.0)	0 (0.0)	2 (15.4)	4 (25.0)	1 (7.1)	4 (15.4)	2 (12.5)	1 (100.0)	6 (16.7)	1 (14.3)	7 (16.3)
Globally	8 (22.9)	0 (0.0)	0 (0.0)	2 (15.4)	2 (12.5)	4 (28.6)	6 (23.1)	2 (12.5)	0 (0.0)	7 (19.4)	1 (14.3)	8 (18.6)
<i>What was your role within the research process?</i>												
Collected data and named author	15 (42.9)	1 (20.0)	0 (0.0)	5 (38.5)	4 (25.0)	7 (50.0)	12 (46.2)	4 (25.0)	0 (0.0)	14 (38.9)	2 (28.6)	16 (37.2)
Collected data and part of a writing group	13 (37.1)	2 (40.0)	3 (100.0)	7 (53.8)	7 (43.8)	4 (28.6)	7 (26.9)	11 (68.8)	0 (0.0)	16 (44.4)	2 (28.6)	18 (41.9)
Collected data only	2 (5.7)	1 (20.0)	0 (0.0)	0 (0.0)	1 (6.3)	2 (14.3)	2 (7.7)	0 (0.0)	1 (100.0)	1 (2.8)	2 (28.6)	3 (7.0)
Designed the study	5 (14.3)	1 (20.0)	0 (0.0)	1 (7.7)	4 (25.0)	1 (7.1)	5 (19.2)	1 (6.3)	0 (0.0)	5 (13.9)	1 (14.3)	6 (14.0)

Figure S1. Barchart comparing research active and not research active EU survey participants showing proportions by demographic characteristics, workplace, involvement in policy and public health agency (PHA) work.

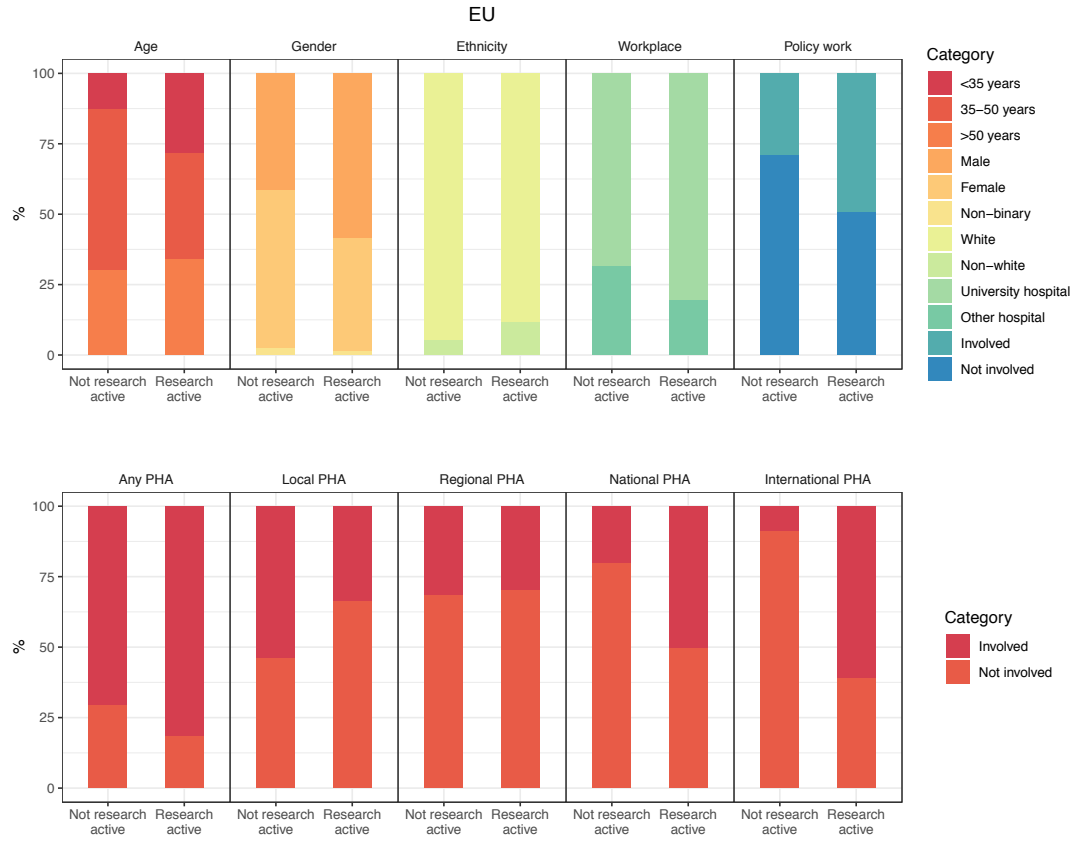


Table S4. Summary of responses to research engagement questions from all US survey respondents. Results presented as n (%). AHP: allied health professional.

	Job title			Age in years			Gender			Ethnicity		Total (n=58)
	Consultant (n=40)	Doctor-in-training (n=2)	Nurse or AHP (n=16)	<35 (n=8)	35-50 (n=23)	>50 (n=27)	Male (n=27)	Female (n=30)	Non-binary (n=1)	White (n=38)	All other groups (n=20)	
<i>Have you contributed to monkeypox research?</i>												
Yes	16 (40.0)	1 (50.0)	5 (31.2)	4 (50.0)	11 (47.8)	7 (25.9)	9 (33.3)	13 (43.3)	0 (0.0)	15 (39.5)	7 (35.0)	22 (37.9)
No	24 (60.0)	1 (50.0)	11 (68.8)	4 (50.0)	12 (52.2)	20 (74.1)	18 (66.7)	17 (56.7)	1 (100.0)	23 (60.5)	13 (65.0)	36 (62.1)
<i>How would you describe your area of research focus?</i>												
Clinical	16 (40.0)	1 (50.0)	5 (31.2)	4 (50.0)	11 (47.8)	7 (25.9)	9 (33.3)	13 (43.3)	0 (0.0)	15 (39.5)	7 (35.0)	22 (37.5)
Epidemiology	7 (17.5)	0 (0.0)	0 (0.0)	1 (12.5)	3 (13.0)	3 (11.1)	1 (3.7)	6 (20.0)	0 (0.0)	4 (10.5)	3 (15.0)	7 (12.1)
Public health	2 (5.0)	0 (0.0)	1 (6.2)	0 (0.0)	2 (8.7)	1 (3.7)	0 (0.0)	3 (10.0)	0 (0.0)	3 (7.9)	0 (0.0)	3 (5.2)
Basic Science	1 (2.5)	0 (0.0)	0 (0.0)	0 (0.0)	1 (4.3)	0 (0.0)	0 (0.0)	1 (3.3)	0 (0.0)	0 (0.0)	1 (5.0)	1 (1.7)
<i>Have you been involved with monkeypox policy work?</i>												
Yes	14 (35.0)	0 (0.0)	4 (25.0)	2 (25.0)	7 (30.4)	9 (33.3)	9 (33.3)	9 (30.0)	0 (0.0)	12 (31.6)	6 (30.0)	18 (31.0)
No	26 (65.0)	2 (100.0)	12 (75.0)	6 (75.0)	26 (69.6)	18 (66.7)	18 (66.7)	21 (70.0)	1 (100.0)	26 (68.4)	14 (70.0)	40 (69.0)
<i>Did you attend briefing meetings and calls with public health agencies?</i>												
National	12 (30.0)	0 (0.0)	2 (12.5)	2 (25.0)	5 (21.7)	7 (25.9)	7 (25.9)	7 (23.3)	0 (0.0)	6 (15.8)	8 (40.0)	14 (24.1)
Regional	14 (35.0)	0 (0.0)	6 (37.5)	1 (12.5)	7 (30.4)	12 (44.4)	6 (22.2)	14 (46.7)	0 (0.0)	15 (39.5)	5 (25.0)	20 (34.5)
Local e.g. your clinic/service facility	25 (62.5)	2 (100.0)	11 (68.8)	7 (87.5)	19 (82.6)	12 (44.4)	16 (59.3)	22 (73.3)	0 (0.0)	24 (63.2)	14 (70.0)	38 (65.5)
International e.g. WHO, ECDC	5 (12.5)	0 (0.0)	0 (0.0)	1 (12.5)	1 (4.3)	3 (11.1)	3 (11.1)	2 (6.7)	0 (0.0)	2 (5.3)	3 (15.0)	5 (8.6)
None	9 (22.5)	0 (0.0)	5 (31.2)	1 (12.5)	4 (17.4)	9 (33.3)	8 (29.6)	5 (16.7)	1 (100.0)	10 (26.3)	4 (20.0)	14 (24.1)
Contributed to monkeypox research	Job title			Age in years			Gender			Ethnicity		Total (n=22)
	Consultant (n=16)	Doctor-in-training (n=1)	Nurse or AHP (n=5)	<35 (n=4)	35-50 (n=11)	>50 (n=7)	Male (n=9)	Female (n=13)	Non-binary (n=0)	White (n=15)	All other groups (n=7)	
<i>How much has your other research been affected as a result of your monkeypox research?</i>												
Not at all	7 (43.8)	0 (0.0)	1 (20.0)	2 (50.0)	3 (27.3)	3 (42.9)	3 (33.3)	5 (38.5)	-	6 (40.0)	2 (28.6)	8 (36.3)
Suffered slightly	7 (43.8)	1 (100.0)	2 (40.0)	2 (50.0)	4 (36.4)	4 (57.1)	4 (44.4)	6 (46.2)	-	7 (46.7)	3 (42.9)	10 (45.5)
By a moderate amount	1 (6.3)	0 (0.0)	2 (40.0)	0 (0.0)	3 (27.3)	0 (0.0)	2 (22.2)	1 (7.7)	-	1 (6.7)	2 (28.6)	3 (13.6)
Considerably suffered	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	-	0 (0.0)	0 (0.0)	0 (0.0)
Extremely suffered	1 (6.3)	0 (0.0)	0 (0.0)	0 (0.0)	1 (9.1)	0 (0.0)	0 (0.0)	1 (7.7)	-	1 (6.7)	0 (0.0)	1 (4.5)
<i>Have you published or submitted any research to a journal on monkeypox during this outbreak?</i>												
Yes	5 (31.3)	1 (100.0)	0 (0.0)	2 (50.0)	2 (18.2)	2 (28.6)	1 (11.1)	5 (38.5)	-	4 (26.7)	2 (28.6)	6 (27.3)
No	11 (68.8)	0 (0.0)	5 (100.0)	2 (50.0)	9 (81.8)	5 (71.4)	8 (88.9)	8 (61.5)	-	11 (73.3)	5 (71.4)	16 (72.7)
<i>Have you obtained grant money for research on monkeypox?</i>												
Yes	4 (25.0)	0 (0.0)	0 (0.0)	0 (0.0)	3 (27.3)	1 (14.3)	2 (22.2)	2 (15.4)	-	2 (13.3)	2 (28.6)	4 (18.1)
No	10 (62.5)	1 (100.0)	5 (100.0)	4 (100.0)	8 (72.8)	4 (57.1)	6 (66.7)	10 (76.9)	-	12 (80.0)	4 (57.1)	16 (72.7)
Applied but not heard	2 (12.5)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	2 (28.6)	1 (11.1)	1 (7.7)	-	1 (6.7)	1 (14.3)	2 (9.1)
<i>Have you been asked to be involved with any media outlets to do with monkeypox?</i>												
Yes	10 (62.5)	0 (0.0)	0 (0.0)	0 (0.0)	5 (45.5)	5 (71.4)	4 (44.4)	6 (46.2)	-	7 (46.7)	3 (42.9)	10 (45.5)
No	6 (37.5)	1 (100.0)	5 (100.0)	4 (100.0)	6 (54.5)	2 (28.6)	5 (55.6)	7 (53.8)	-	8 (53.3)	4 (57.1)	12 (54.5)
Published or submitted any research	Job title			Age in years			Gender			Ethnicity		Total (n=6)
	Consultant (n=5)	Doctor-in-training (n=1)	Nurse or AHP (n=0)	<35 (n=2)	35-50 (n=2)	>50 (n=2)	Men (n=1)	Women (n=5)	Non-binary (n=0)	White (n=4)	All other groups (n=2)	

<i>Did you collaborate with colleagues?</i>												
In your own service	0 (0.0)	0 (0.0)	-	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	-	0 (0.0)	0 (0.0)	0 (0.0)
In your own country	3 (60.0)	1 (100.0)	-	2 (100.0)	1 (50.0)	1 (50.0)	1 (100.0)	3 (60.0)	-	3 (75.0)	1 (50.0)	4 (66.7)
In your own region	1 (20.0)	0 (0.0)	-	0 (0.0)	0 (0.0)	1 (50.0)	0 (0.0)	1 (20.0)	-	1 (25.0)	0 (0.0)	1 (16.7)
Globally	1 (20.0)	0 (0.0)	-	0 (0.0)	1 (50.0)	0 (0.0)	0 (0.0)	1 (20.0)	-	0 (0.0)	1 (50.0)	1 (16.7)
<i>What was your role within the research process?</i>												
Collected data and named author	3 (60.0)	0 (0.0)	-	0 (0.0)	2 (100.0)	1 (50.0)	0 (0.0)	3 (60.0)	-	1 (25.0)	2 (100.0)	3 (50.0)
Collected data and part of a writing group	1 (20.0)	1 (100.0)	-	1 (50.0)	0 (0.0)	1 (50.0)	0 (0.0)	2 (40.0)	-	2 (50.0)	0 (0.0)	2 (33.3)
Collected data only	0 (0.0)	0 (0.0)	-	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	-	0 (0.0)	0 (0.0)	0 (0.0)
Designed the study	1 (20.0)	0 (0.0)	-	1 (50.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	-	1 (25.0)	0 (0.0)	1 (16.7)

Figure S2. Barchart comparing research active and not research active US survey participants showing proportions by demographic characteristics, workplace, involvement in policy and public health agency (PHA) work.

