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A Rapid, Application-Based Survey to Characterize the Impacts of COVID-19 on LGBTQ+ Communities Around the World: an observational study

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Title:

A Rapid, Application-Based Survey to Characterize the Impacts of COVID-19 on LGBTQ+ Communities Around the World: an observational study

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Abstract

Introduction: Emerging evidence indicates that the COVID-19 pandemic, and the responses it has generated, have had disproportionate impacts on lesbian, gay, bisexual, transgender, and queer (LGBTQ+) communities. Most studies to date have focused on qualitative assessments with limited empiric quantitative study.

Methods: In response, a cross-sectional survey was administered to a global sample of LGBTQ+ individuals (n=13,562) between April 16th and May 20th, 2020 via the social networking application Hornet. The survey contained questions that characterize the impact of COVID-19 and associated mitigation strategies on economics, employment, mental health, and access to healthcare.

Results: 5,241 (43·9%) individuals indicated they were somewhat, slightly, or unable to meet basic needs with their current income, while 2,848 (24·1%) and 4,746 (40·1%) felt physically or emotionally unsafe in their living environment, respectively. 2,217 individuals (24·7%) stated they are at risk for losing health insurance coverage. 2,723 (21.8%) persons reported having skipped or cut meals as there was not enough money.

Conclusion: Many LGBTQ+ persons who responded reported adverse consequences to mental health, economics, interruptions to care, and lack of support from their government. This data is part of ongoing analyses but accentuates the unique needs of LGBTQ+ communities that will require targeted, ameliorative approaches.

Article Summary

Strengths and limitations of this study:

- Large, global sample of LGBTQ+ persons regarding the impact of COVID-19 - likely one of, if not the first of, its kind
- Considers the immediate and secondary effects of COVID-19 on the LGBTQ+ community
- Led by a multi-sector, collaborative research working group
- Convenience sample of individuals who have resources, including the liberty to use networking-applications such as Hornet
- Underscores the need for improved monitoring and continued data collection to guide future programs and policies

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feedback based on their individual expertise and the policies of their centers critically reviewed the manuscript. All authors agreed to submit the final version of the manuscript.

Declaration of Interests: All authors declare no competing interests.

No additional data available currently.

This article highlights data collected from a collaborative effort between the LGBT Foundation, Hornet Gay Social Network, Tech4HIV, and Johns Hopkins University (JHU). The COVID Disparities Working Group includes these entities with input from the University of California, San Francisco (UCSF), Google, UNAIDS, The World Health Organization (WHO), and others. The working group conducted a rapid survey of a global, non-representative sample of LGBTQ+ individuals regarding their experience during the COVID-19 pandemic.

Introduction:

As COVID-19 continues to sweep across the globe, LGBTQ+ communities continue to be particularly vulnerable, with all stages of the continuum of care and prevention being disrupted.[1,2] There has been significant heterogeneity in the burden of COVID and the stringency of prevention and mitigation measures around the world[3]. The ability to rapidly adjust implementation strategies to maintain physical distancing and adherence to guidelines has likely varied based on underlying infrastructure and resources, including such aspects as population density, crowded housing, use of public transportation, rates of incarceration or other group or closed housing settings, and structural barriers such as stigma, homophobia, and racism.

Socio-economic status, and the ability to self-isolate, telecommute, and practice good hygiene have emerged as social determinants of COVID-19 outcomes. Many vulnerable groups have suffered disproportionately, including migrant workers in many contexts, undocumented migrants in the US, prisoners and detainees, and others at the margins of societies. Collectively, gaps of varying intensity have emerged around the world that may reinforce underlying health and other disparities and inequities. To assess the socioeconomic and health impacts of the current crisis on LGBTQ+ communities globally, a rapid, application-based survey was developed to collect additional evidence.

Methods:

This cross-sectional study was conducted based on a COVID-19 disparities survey implemented by the gay social networking application, Hornet. The app is a free, smart-phone based "Gay Social Networking" application with over 25 million users worldwide and has previously been used for conducting research on LGBTQ+ communities worldwide. The data presented here was collected between April 16, 2020 and May 4, 2020, when Hornet users were invited to participate in a brief questionnaire with 58 questions regarding the impact of COVID-19 on employment, insurance coverage, ability to make ends meet, and mental health. Any Hornet user who was over the age of 18 and able to provide consent were eligible. The survey was made available in English, Arabic, Spanish, French, Russian, Portuguese, Italian, Simplified and Traditional Chinese, Malay, Thai, Indonesian, Farsi, and Turkish. Only descriptive analysis were conducted on the full sample in order to characterize the impact on the full, global LGBTQ+ community that the sample

represented. Given the nature of convenience sampling and the subsequent descriptive analysis outlined here, sensitivity analyses and controlling for confounding was deemed not necessary. In order to account for missing data and minimize response bias between outcomes, each outcome was analyzed individually with the respective number of individuals who responded. In order to minimize bias between outcomes, each outcome was analyzed individually with the respective number of individuals who responded. Study procedures were reviewed by the Johns Hopkins School of Public Health Institutional Review Board, which determined that the protocol qualified for Exempt status under Category 4.

Eligible, consenting individuals responded to general demographic questions on age, country of origin, sex assigned at birth, gender identity and sexual orientation. Participants were also asked about their HIV serostatus. The questionnaire was designed by combining validated instruments with newly created indicators specific to the impacts of COVID-19 on the following areas: 1) Mental Health; 2) Economics and Employment; and 3) Access to Care.

Patient and Public Involvement

Amidst the ongoing COVID-19 pandemic, efforts were undertaken to characterize the continued impact on members of the LGBTQ+ community. Given the nature of inequities often faced by LGBTQ+ persons, special consideration was given to economics, mental health, and access to care during research question, outcome, and survey development. While the public was not directly involved in development, the unique needs of the global LGBTQ+ community were centered in the design, translation, and implementation of this research. Furthermore, there is a significant representation of LGBTQ+ identifying individuals within the COVID-19 Disparities Working Group. With clear plans for dissemination of any and all results to the entirety of the Hornet user base.

Mental Health

The survey asked individuals about the impact of the COVID-19 pandemic on their mental health; anxiety (e.g. “Have you been feeling anxious since the COVID-19 crisis began?”); loneliness (e.g. “Have you been feeling lovely since the COVID-19 crisis began?”); current living environment (e.g. “How do you feel about your current living environment?”).

Economics and Employment

The impact of COVID-19 on economics and employment were assessed through questions regarding economic and employment status; type of work (e.g. “What kind of work do you currently do?”); ability to miss work (e.g. “Can you afford to miss work during COVID-19?”); ability to meet basic needs (e.g. “How well are you able to meet your basic needs (e.g. food, clothing, transportation, education, and healthcare) with your current income?”; financial support from work or government (e.g. “Are you receiving any additional financial benefits from work or government because of the COVID-19 crisis?”); and access to food (e.g. “Since the COVID-19 crisis began, have you had to cut the size of your meals or skip meals because there was not enough money for food?”).

Access to Care

Individuals were asked whether about healthcare coverage amid the COVID-19 pandemic, such as source of insurance (e.g. "What is the primary source of healthcare coverage?"); losing insurance (e.g. "Do you expect to lose your health insurance coverage because of the COVID-19 crisis?

Results:

All individuals who consented to taking the survey were considered eligible, though not everyone responded to every question as it did not apply to them, or simply chose not to. The number of persons who responded to individual questions are reported as outcome events for each question.

Between April 16 2020 and May 4, 2020 13,562 individuals from 132 countries responded to the survey (Figure 1), ranging in age from under 18 to 85+. Most respondents were either younger than 30 years old (38·2%) or between the ages of 30 and 49 (49·8%). 12% (n=1,440) respondents indicated that they were living with HIV, and 60% of these indicated that they were undetectable. The data also represent samples from some of the most COVID-affected countries globally, including Russia, Brazil, France, and Mexico. Since only descriptive statistics were conducted on the data collected from an anonymous survey, no efforts to reduce potential sources were undertaken. Additionally, no further subgroup analyses were conducted in order to give a broad, descriptive overview of the impact of COVID-19 on the global LGBTQ+ community.

Country of Origin

Figure 1. highlights the geographic diversity captured by this survey, indicating the global impact of the crisis on members of this community. Majority of respondents were from Asia (64·5%), Europe (18·7%), and Latin America (8·95%), generally reflecting Hornet's user base. Hornet is used by a diverse community, but the large majority of users are men who have sex with men, with varying identities including gay and bisexual men and other MSM.

Mental Health

Given intersecting stigmas and minority stress, LGBTQ+ communities are well known to bear high burdens of mental health conditions.[4] 26·8% (3,285/12,271) of LGBTQ+ persons indicated that they have been feeling very anxious since the COVID-19 crisis began, and another 42·9% (5,259/12,271) indicated that they were a little anxious. Similarly, 27·8% (3,285/12,272) of those who participated indicated that they have been feeling very lonely while another 35·1% (5,259/12,272) indicated that they were a little lonely. Additionally, 2,848 (24·1%) and 4,746 (40·1%) responded that they feel either physically or emotionally unsafe in their current living

environment.

Economics and Employment

LGBTQ+ individuals are more likely to be employed in service, sales, and hospitality industries[5], all of which are directly and heavily impacted by the COVID-19 crisis. The significance of such employment demographics are reflected in the data collected, with 26·5% (3,159/11,913) of persons responding that they work in either the service or hospitality industries and 37·8% (4,508/11,916) indicating that they cannot afford to miss work during the COVID-19 crisis. Of the 11,928 LGBTQ+ persons who responded to whether or not they were able to meet their basic needs (e.g., food, clothing, shelter, transportation, education, and healthcare) with their current income, 3,019 (25·4%) indicated only somewhat, 1,715 indicated slightly (14·4%), and 507 (4·3%) responded not at all. Additionally, 50·1% (4,850/9,690) reported to not be receiving financial benefits from their government, despite need, while 21.8% (2723/12,509) individuals indicated that they have had to cut or skip meals because there was not enough money for food. As we seek to respond to the devastating blow this pandemic has dealt to the economy and the traditional employment-based health insurance model, we must acknowledge and address the particular health and economic risk that already marginalized communities face.

Access to Care

There are existing gaps in care for LGBTQ+ individuals, with many being underinsured or lacking insurance entirely[6]. Those living in countries without a nationalized health program are left at increased risk for both economic and health-related despair. The high cost of health services that are required when someone becomes infected with COVID-19 further adds to this already heavy burden. 15·9% (1,895/11,932) and 46·4% (5,529/11,932) of individuals indicated that they have no healthcare coverage or it is private/non-governmental/employer-provided, respectively. Additionally, 9·3% (830/8965) responded that they will definitely or probably lose their insurance coverage because of COVID-19 and 15·5% (1387/8965) that they might or might not lose insurance coverage.

Discussion:

COVID-19 has rapidly emerged as a major public health threat, causing significant global disruption. Growing evidence indicates that the incidence of COVID-19 is higher in communities of lower socioeconomic status, in which LGBTQ+ individuals are over-represented given their long history of economic marginalization[5]. Additionally, higher burdens of mental health and infectious diseases -- due to the intersection of upstream determinants such as stigma, criminalization of same-sex practices and sex work, and continued limited investment in these communities -- place LGBTQ+ individuals at even higher risk. Such compounding vulnerabilities result in earlier disruptions to health services, leading to prolonged periods without access to care.[7] Of particular concern are the nearly half of individuals who reported to be struggling or suffering;

the third who replied that they were not receiving assistance from their government but needed it; and the quarter who were unable to see their HIV medical provider or were unsure whether they would lose their job as a result of the COVID-19 crisis.

Notably, there are some limitations of this study. Individuals must be users of Hornet in order to participate in the survey, and thus must have internet and smartphone access, limiting generalizability of the findings to a target population of interest. Additionally, emerging evidence indicates that COVID-19 is having a larger impact on those of lower socioeconomic status (i.e. without internet or smartphone access); therefore it is possible that this underestimates the true magnitude of the pandemic on more marginalized individuals in these communities. Even so, prior studies have documented the success of using social networking platforms to reach hidden and stigmatized populations. It is also possible that barriers such as language or stigma, led particular subgroups to not participate or complete the survey in its entirety, resulting in non-response bias. To mitigate this, we plan to translate later iterations of the study into additional languages. Meaning that further studies, including but not limited to qualitative interviews, will be required to characterize the impact of the COVID-19 crisis further. As well, this is a convenience sample and cross-sectional in nature, so may not be representative of the whole LGBTQ+ community and precludes our ability to examine temporality in the outcomes we analyzed.

Despite these limitations, the novel use of a rapid survey among users of a social network application provides insight into the effects felt by the LGBTQ+ community in real-time, when it may otherwise be infeasible to collect such information as scale. A major strength of this study is the data collected on 13,562 individuals from over 131 countries, which can be used for future research related to the implications of COVID-19. Collectively, these results reflect the impact that the pandemic will have on the LGBTQ+ community, and the need for continued monitoring and policy action as the COVID-19 crisis progresses.

Conclusion:

These findings represent individuals from 132 countries around the world, and highlight the clear immediate and secondary effects of COVID-19 on LGBTQ+ communities; while emphasizing the need for additional data to guide future programs and policies.

Many countries do not include recognition or metrics on sexual orientation and gender identity in their data collection. If not for surveys of this kind, which leverages a global social network and app-based technology, we would be unable to obtain this quantity of accurate, and real-time information on how marginalized communities are being impacted by the pandemic, nor at this level of granularity. This novel, technology-based approach highlights the profoundly detrimental impact that COVID-19 is having and will continue to have on LGBTQ+ communities, thereby underscoring the need for a data-driven and timely response, both immediately and in the wake of this crisis.

Figure 1.

References

1. Jiang H, Zhou Y, Tang W. Maintaining HIV care during the COVID-19 pandemic. *Lancet HIV*. 2020;7(5): e308-e309. doi:10.1016/S2352-3018(20)30105-3

2. Santos, GM, Ackerman, B, Rao A, Wallach, S, Ayala, G, Lamontage, E, Garner, A, Holloway, Arreola, I, Silenzio, V, Strömdahl, S, Yu, L, Strong, C, Adamson, T, Yakusik, A, Doan, T, Huang, P, Cerasuolo, D, Bishop, A, Noori, T, Pharris, A, Aung, M, Dara, M, Chung, S, Hanley, M, Baral, S, Beyrer, C, Howell, S. Economic, Mental Health, HIV Prevention and HIV Treatment Impacts of COVID-19 and the COVID-19 response on a Global Sample of Cisgender Gay Men and Other Men who have sex with Men. *medRxiv* 2020.

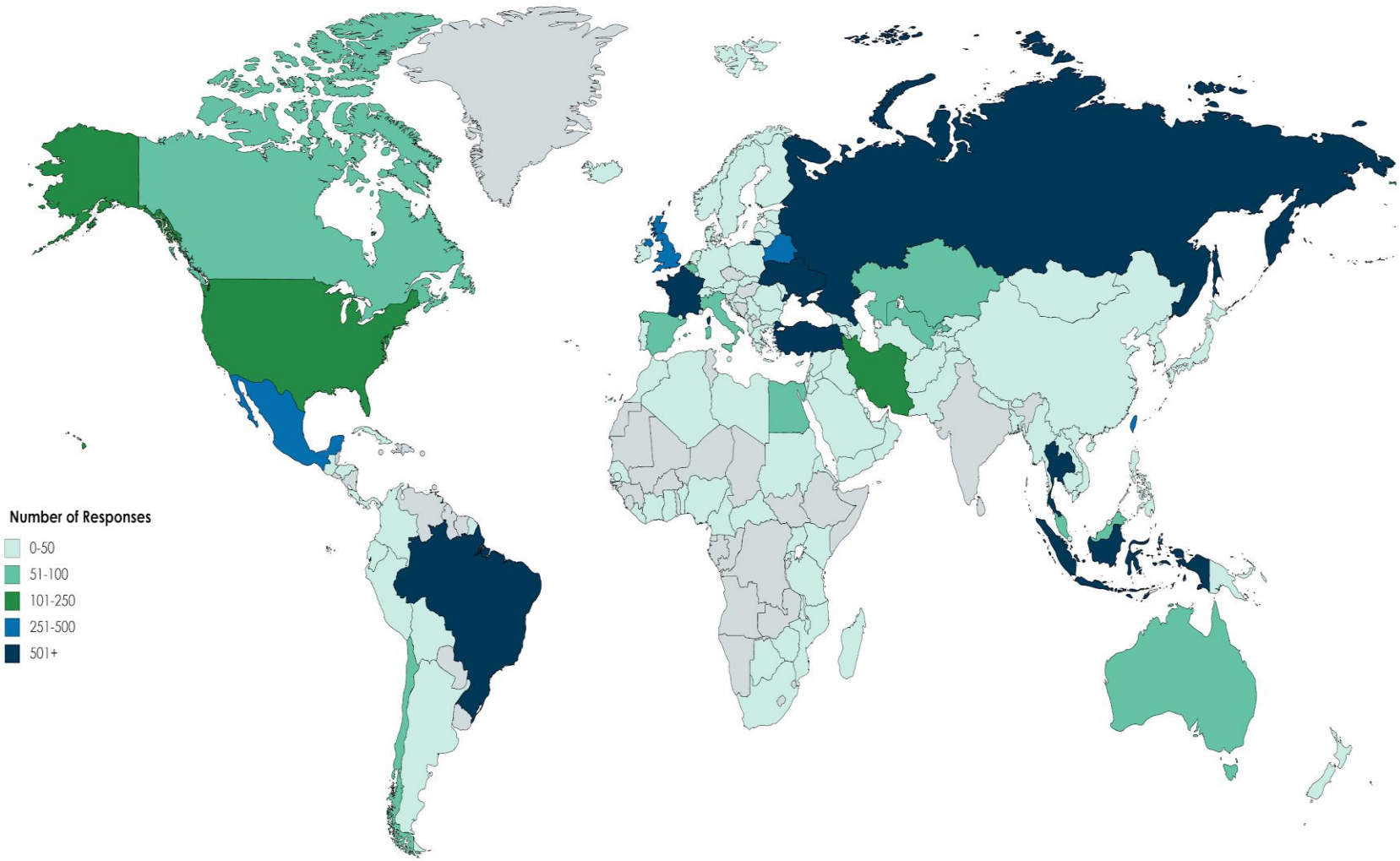
3. Hale T, Webster S, Petherick A, Phillips T, and Beatriz K. Oxford COVID-19 Government Response Tracker. *Blavatnik School of Governmen*t 2020; Data use policy: Creative Commons Attribution CC BY standard.

4. Kelleher C. Minority stress and health: Implications for lesbian, gay, bisexual, transgender, and questioning (LGBTQ) young people. *Counselling Psychology Quarterly* 2009; 22(4): 373-9. doi:10.1080/09515070903334995.

5. Human Rights Campaign, Charlie Whittington, Katalina Hadfield, Carina Calderón. The Lives & Likelihoods of many in the LGBTQ Community are at risk amidst COVID-19 Crisis. 2020.

6. Mulé NJ, Ross LE, Deeprose B, Jackson BE, Daley A, Travers A, Moore D. Promoting LGBT health and wellbeing through inclusive policy development. *International journal for equity in health* 2009; 8(1): 18. doi:10.1186/1475-9276-8-18.

7. Fredriksen-Goldsen K, Simoni JM, Kim H, et al. The health equity promotion model: Reconceptualization of lesbian, gay, bisexual, and transgender (LGBT) health disparities. *Am J Orthopsychiatry* 2014; 84(6): 653-63. doi:10.1037/ort0000030.


Number of Responses
0-50
51-100
101-250
251-500
501+

STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No	Recommendation
Title and abstract	1✓	(*a*) Indicate the study's design with a commonly used term in the title or the abstract
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found
Introduction		
Background/rationale	2✓	Explain the scientific background and rationale for the investigation being reported
Objectives	3✓	State specific objectives, including any prespecified hypotheses
Methods		
Study design	4✓	Present key elements of study design early in the paper
Setting	5✓	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection
Participants	6✓	(*a*) *Cohort study*—Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up *Case-control study*—Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls *Cross-sectional study*—Give the eligibility criteria, and the sources and methods of selection of participants
		(*b*) *Cohort study*—For matched studies, give matching criteria and number of exposed and unexposed *Case-control study*—For matched studies, give matching criteria and the number of controls per case
Variables	7✓	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable
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
Bias	9✓	Describe any efforts to address potential sources of bias
Study size	10✓	Explain how the study size was arrived at
Quantitative variables	11✓	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why
Statistical methods	12✓	(*a*) Describe all statistical methods, including those used to control for confounding
		(*b*) Describe any methods used to examine subgroups and interactions
		(*c*) Explain how missing data were addressed
		(*d*) *Cohort study*—If applicable, explain how loss to follow-up was addressed *Case-control study*—If applicable, explain how matching of cases and controls was addressed *Cross-sectional study*—If applicable, describe analytical methods taking account of sampling strategy
		(*e*) Describe any sensitivity analyses

Continued on next page

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
		(b) Give reasons for non-participation at each stage
		(c) Consider use of a flow diagram
Descriptive data	14* ✓	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders
		(b) Indicate number of participants with missing data for each variable of interest
		(c) *Cohort study*—Summarise follow-up time (eg, average and total amount)
Outcome data	15* ✓	*Cohort study*—Report numbers of outcome events or summary measures over time
		Case-control study—Report numbers in each exposure category, or summary measures of exposure
		Cross-sectional study—Report numbers of outcome events or summary measures
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
		(*b*) Report category boundaries when continuous variables were categorized
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period
Other analyses	17 ✓	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses
Discussion		
Key results	18 ✓	Summarise key results with reference to study objectives
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
Interpretation	20 ✓	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence
Generalisability	21 ✓	Discuss the generalisability (external validity) of the study results
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

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

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.

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Abstract

Introduction: Emerging evidence indicates that the COVID-19 pandemic, and the responses it has generated, have had disproportionate impacts on lesbian, gay, bisexual, transgender, and queer (LGBTQ+) communities. This study seeks to build on existing information and provide regional insight.

Methods: In response, a cross-sectional survey was administered to a global sample of LGBTQ+ individuals (n=13,358) between April 16th and May 20th, 2020 via the social networking application Hornet. The survey contained questions that characterize the impact of COVID-19 and associated mitigation strategies on economics, employment, mental health, and access to health care.

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Conclusion: Many LGBTQ+ persons who responded reported adverse consequences to mental health, economics, interruptions to care, and lack of support from their government. This data is part of ongoing analyses but accentuates the unique needs of LGBTQ+ communities that will require targeted, ameliorative approaches.

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Strengths and limitations of this study:

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No additional data available currently.

This article highlights data collected from a collaborative effort between the LGBT Foundation, Hornet Gay Social Network, Tech4HIV, and Johns Hopkins University (JHU). The COVID Disparities Working Group includes these entities with input from the University of California, San Francisco (UCSF), Google, UNAIDS, The World Health Organization (WHO), and others. The working group conducted a rapid survey of a global, non-representative sample of LGBTQ+ individuals regarding their experience during the COVID-19 pandemic.

Introduction:

COVID-19 continues to sweep across the globe, with over 100 million confirmed cases and 2.2 million deaths.[1] LGBTQ+ communities continue to be particularly vulnerable, with all stages of the continuum of care and prevention being disrupted.[2–4] There has been significant heterogeneity in the burden of COVID and the stringency of prevention and mitigation measures around the world. [5] The ability to rapidly adjust implementation strategies to maintain physical distancing and adherence to guidelines has likely varied based on underlying infrastructure and resources, including such aspects as population density, crowded housing, use of public transportation, rates of incarceration or other group or closed housing settings, and structural barriers such as stigma, homophobia, and racism. While these efforts have helped to curb the growth of new cases, they've had vast social, economic, and health care consequences.[6–8]

Socio-economic status, and the ability to self-isolate, telecommute, and practice good hygiene have emerged as social determinants of COVID-19 outcomes. Many vulnerable groups have suffered disproportionately, including migrant workers in many contexts, undocumented migrants, ethnic/racial minorities, prisoners and detainees, and others at the margins of societies [9–11]. Reports also indicate the unique concerns and challenges experienced by members of the LGBTQ+ community resulting from anti-gay backlash and community crackdown under false pretexts. [12–14] Moreover, many members of the LGBTQ+ community are at increased risk for food insecurity, unemployment, and unstable housing, thereby making them more vulnerable to the economic and health impacts from COVID-19. [7,15–18]

COVID-19 may also amplify existing barriers to HIV prevention, testing, and care, which could also slow efforts to achieve global HIV targets. [19] Members of the LGBTQ community are among those at highest risk for HIV, with gay men and other MSM being 22 times more likely to acquire HIV than the worldwide general population. [20] Reductions in access to HIV testing, condoms, Pre-Exposure-Prophylaxis (PEP), Post-Exposure Prophylaxis put this community at higher risk for seroconversion. [21–26] These interruptions also have wide-ranging implications for those who do seroconvert, or who are already living with HIV, such as increased viral load, increased transmission, and even drug resistance[27–29] Highlighting the impact of COVID-19

on the HIV care continuum will be of crucial importance both during and beyond the pandemic. Collectively, gaps of varying intensity have emerged around the world likely reinforce underlying health and other disparities and inequities. For members of the LGTBQ+ community, existing structural vulnerabilities demand a unique and targeted response to COVID-10 to ameliorate its impacts. Additionally, given the wide variation in sociopolitical climates and responses to COVID-19 in countries around the world, regional analyses will be critical to examine how sub-populations are being disproportionately affected, including racial/ethnic minorities, immigrants, sex workers, and socio-economically disadvantaged groups. To assess the socioeconomic and health impacts of the current crisis on LGBTQ+ individuals around the world, a rapid, application-based survey was developed to collect additional evidence.

Methods:

This cross-sectional study was conducted based on data collected from the COVID-19 disparities survey implemented by the gay social networking application, Hornet. The app is a free, smart phone based "Gay Social Networking" application with over 25 million users worldwide and has previously been used for conducting research on LGBTQ+ communities worldwide. The data presented here was collected between April 16, 2020 and May 4, 2020, when Hornet users were invited to participate in a brief questionnaire with 58 questions regarding demographics and the impact of COVID-19 on economic vulnerability, access to care, and mental health. Any Hornet user who was over the age of 18 and able to provide consent were eligible. The survey was made available in English, Arabic, Spanish, French, Russian, Portuguese, Italian, Simplified and Traditional Chinese, Malay, Thai, Indonesian, Farsi, and Turkish. Only descriptive analysis were conducted on the full sample in order to characterize the impact on the full, global LGBTQ+ community that the sample represented. There is wide variation in the acceptance and marginalization of LGBTQ+ people around the world, and to control for such differences, individual responses were stratified and analyzed by World Health Organization (WHO) regions. The aim of this descriptive analysis was to lay a foundation and fill in data gaps on the economic and health impact of COVID-19 on LGBTQ+ communities around the world, creating an opportunity for researchers who are more familiar with such differences to expand on and further contextualize the results presented here. Given the nature of convenience sampling and the subsequent descriptive analysis outlined here, sensitivity analyses and controlling for confounding was deemed not necessary.

To ensure the equality of our sample, duplicates were screened out based on IP address, and searched for identical responses to randomly selected variables, but found none. In order to minimize bias between outcomes, each outcome was analyzed individually with the respective number of individuals who responded. Study procedures were reviewed by the Johns Hopkins School of Public Health Institutional Review Board, which determined that the protocol qualified

for Exempt status under Category 4.

Measures:

Eligible, consenting individuals responded to general demographic questions on age, country of origin, sex assigned at birth, gender identity and sexual orientation. Participants were also asked about their HIV serostatus. The questionnaire was designed by combining validated instruments with newly created indicators specific to the impacts of COVID-19 on the following areas: 1) Mental Health; 2) Economics and Employment; and 3) Access to Care.

Patient and Public Involvement

Amidst the ongoing COVID-19 pandemic, efforts were undertaken to characterize the continued impact on members of the LGBTQ+ community. Given the nature of inequities often faced by LGBTQ+ persons, special consideration was given to economics, mental health, and access to care during research question, outcome, and survey development. While the public was not directly involved in development, the unique needs of the global LGBTQ+ community were centered in the design, translation, and implementation of this research. Furthermore, there is a significant representation of LGBTQ+ identifying individuals within the COVID-19 Disparities Working Group. With clear plans for dissemination of any and all results to the entirety of the Hornet user base.

Demographic Measures:

Individuals self-reported their age, country of origin, socioeconomic status, history of sex work, years of education, ethnic minority and immigrations status, and access to mask. To increase the power of our analyses, sexual orientation was collapsed into three groups: gay, bisexual, other (lesbian, heterosexual, asexual, pansexual, questioning, and I don't know). Individuals also self-reported gender identity from the following options: gender nonbinary, transgender woman, transgender man, woman, or man.

Mental Health

The survey asked individuals about the impact of the COVID-19 pandemic on their mental health. For indicators of mental health we used the 4-item patient health questionnaire (PHQ-4) to screen for symptoms of depression and anxiety and overall category of psychological distress (none, mild, moderate, severe). [30] Individuals were also asked how they feel about their current living environment (e.g. "How do you feel about your current living environment?") and whether it was emotionally and physically safe

Economics and Employment

The impact of COVID-19 on economics and employment was assessed through questions regarding economic and employment status; type of work (e.g. "What kind of work do you currently do?"); ability to miss work (e.g. "Can you afford to miss work during COVID-19?"); ability to meet basic needs (e.g. "How well are you able to meet your basic needs (e.g. food, clothing, transportation, education, and healthcare) with your current income?"); financial support

from work or government (e.g. "Are you receiving any additional financial benefits from work or government because of the COVID-19 crisis?"); reductions in income (e.g. "How much are you expecting your income to reduce because of the COVID-19 crisis?) and access to food (e.g. "Since the COVID-19 crisis began, have you had to cut the size of your meals or skip meals because there was not enough money for food?").

Access to Care

Individuals were asked about health care coverage amid the COVID-19 pandemic, such as source of insurance (e.g. "What is the primary source of healthcare coverage?"), which was trichotomized as government insurance, no insurance, or private/employer/other; losing insurance (e.g. "Do you expect to lose your health insurance coverage because of the COVID-19 crisis?; access to masks (e.g. "Do you have access to masks for COVID-19 protection), which was then dichotomized into a positive sentiment ("Yes") and negative sentiment ("No"). To further quantify access to care, individuals were asked whether COVID-19 had impacted their access to HIV prevention strategies, including condoms, testing, PrEP, and PEP using Likert-type questions (e.g., "Do you feel you have access to HIV prevention strategies during the COVID-19 crisis?" with the following response options: "Definitely yes", "Probably yes", "Might or might not", "Probably not", "Definitely not").

Results:

All individuals who consented to taking the survey were considered eligible, though not everyone responded to every question as it did not apply to them, or simply chose not to. The number of persons who responded to individual questions are reported as outcome events for each question.

Between April 16 2020 and May 4, 2020 13,358 individuals from 136 countries responded to the survey (Table 1), ranging in age from under 18 to 85+. Most respondents were either younger than 30 years old (39·5%) or between the ages of 30 and 49 (49·8%). 12% (n=1,425) respondents indicated that they were living with HIV, and 60% of these indicated that they were undetectable. Individuals were educated and living in metropolitan areas, with 50.0% having a university degree or more and 72% living in a large or capital city.

Table 1: Demographics of LGBTQ+ individuals from the COVID-19 Disparities Survey distributed between April 16 and May 4, 2020, stratified by WHO region

Variable	Overall (%)	Africa	Americas	Southeast Asia	Europe	Eastern Mediterranean	Western Pacific	p-value[c]
Age	13557	103	1459	1262	9363	536	641	0.007*
>19	740 (5.5)	9 (8.7)	30 (2.1)	61 (4.8)	578 (6.2)	29 (5.4)	33 (5.2)	
20-29	4534 (34.0)	43 (41.8)	349 (23.9)	470 (37.2)	3255 (34.7)	207 (38.6)	213 (33.2)	

30-49	6659(49.8)	40 (38.8)	736 (50.4)	622 (49.3)	4672 (49.9)	377 (51.7)	316 (49.3)	
50+	1424(10.7)	11 (10.7)	344 (23.6)	109 (8.7)	858 (9.2)	23 (4.3)	79 (12.3)	
Years of Education[b]		90	1253	1057	8573	429	573	0.000**
Less than 6 years	742 (6.2)	18 (20.0)	70 (5.6)	198 (18.7)	1259 (14.7)	56 (13.1)	61 (10.6)	
Between 6 and 12 years	1661(13.9)	5 (5.6)	8 (0.6)	45 (4.3)	661 (7.7)	18 (4.2)	5 (0.9)	
Some university but no degree	2199 (18.4)	19 (21.1)	319 (25.5)	160 (15.1)	1564 (18.2)	60 (14.0)	78 (13.6)	
Trade school	1387 (11.6)	12 (13.3)	99 (7.9)	117 (11.0)	1042 (12.2)	43 (10.0)	75 (13.1)	
University degree or more	5981 (50.0)	36 (40.0)	757 (60.4)	537 (50.8)	4047 (47.2)	252 (58.7)	354 (61.8)	
Ethnic Minority[b]	13616	89	1248	1043	8547	423	570	0.08
Yes	2064 (15.2)	36 (40.4)	226 (18.1)	247 (23.7)	1320 (15.4)	142 (33.6)	93 (16.3)	
No	9852 (72.4)	37 (41.6)	915 (73.3)	517 (49.6)	6093 (71.3)	169 (39.9)	423 (74.2)	
I don't know/refuse	1700 (12.5)	16 (18.0)	107 (8.6)	279 (23.7)	1134 (13.3)	112 (26.5)	54 (9.5)	
Immigration Status[b]	11040	83	1182	905	7978	358	537	0.27
First generation	547 (5.0)	5 (6.0)	70 (5.9)	31 (3.4)	382 (4.8)	20 (5.6)	39 (7.3)	
Immigrant	1408 (12.8)	24 (28.9)	89 (7.5)	151 (16.7)	947 (11.9)	106 (29.6)	92 (1.3)	
Parents are native	9085 (82.2)	54 (65.1)	1023 (86.6)	723 (79.9)	6649 (83.3)	232 (64.8)	406 (75.6)	
Urban/rural[b]	11932	90	1246	1048	8558	424	571	0.021*
A capital city	3612 (30.3)	34 (37.8)	531 (42.6)	367 (35.0)	2345 (27.4)	179 (42.2)	158 (27.7)	
A farm or isolated house	95 (0.8)	0 (0.0)	4 (0.3)	16 (1.5)	67 (0.8)	6 (1.4)	2 (0.3)	
A large city	4631 (38.8)	16 (17.8)	368 (29.5)	198 (18.9)	3732 (43.6)	123 (29.0)	194 (34.0)	
A rural area or village	646 (5.4)	8 (8.9)	17 (1.4)	159 (15.2)	402 (4.7)	20 (4.7)	41 (7.2)	
A small city or town	1972 (16.5)	16 (17.8)	223 (17.9)	133 (12.7)	1448 (16.9)	63 (14.9)	91 (15.9)	
A suburb	976 (8.2)	16	103 (8.3)	175	564	33 (7.8)	85	

near large city		(17.8)		(16.7)	(6.6)		(14.9)	
Sexual Orientation[b]	11980	91	1252	1054	8586	430	572	0.13
Gay	8939 (74.6)	12 (13.2)	149 (11.9)	195 (18.5)	1513 (17.6)	74 (17.2)	66 (11.5)	
Bisexual	2009 (16.7)	57 (62.6)	1048 (83.7)	746 (70.8)	6354 (74.0)	254 (59.1)	484 (84.6)	
Others (lesbian, heterosexual, asexual)	1032 (8.6)	22 (24.2)	55 (4.4)	113 (10.7)	719 (8.4)	102 (23.7)	22 (3.9)	
Intersex	132	2	2	65	35	21	7	
Gender Identity[a,b]	11928	90	1250	1047	8569	429	572	0.39
Gender nonbinary		15	56	187	286	20	23	
Transgender woman		5	4	21	94	35	6	
Transgender man		3	8	31	48	9	6	
Man		67	1151	807	7947	364	532	
Woman		11	5	10	100	9	6	
I don't know or I do not wish to answer		10	51	110	384	46	23	
HIV Status[b]	11929	91	1251	1047	8554	420	572	0.11
I don't know		15 (16.5)	132 (10.5)	233 (22.2)	1217 (14.2)	53 (12.6)	78 (1.6)	
I don't want to answer		3 (3.3)	36 (2.9)	97 (9.3)	374 (4.4)	20 (7.8)	23 (4.0)	
I'm HIV-Negative		60 (65.9)	779 (62.3)	581 (55.5)	6059 (70.8)	324 (77.1)	426 (74.5)	
I'm HIV-Positive		7 (7.7)	96 (7.7)	66 (6.3)	372 (4.3)	13 (3.1)	9 (1.6)	
I'm HIV-Positive and Undetectable		6 (6.6)	208 (16.6)	70 (6.7)	532 (6.3)	10 (2.4)	36 (6.3)	
Sex work[b]	11787	87	1219	1027	8486	420	554	0.24
I don't know/refuse	710	3 (3.5)	32 (3.6)	65 (6.3)	552 (6.5)	37 (8.8)	22 (4.0)	
Never	9564	63 (72.4)	1041 (85.4)	720 (70.1)	6938 (81.8)	304 (72.4)	501 (90.4)	
Yes	1513	21 (24.1)	146 (12.0)	242 (23.6)	996 (11.7)	79 (18.8)	301 (5.6)	

Socioeconomic Status	11983	91	1254	1060	8580	430	573	0.007*
Lower	1079	13 (14.3)	111 (8.8)	161 (15.2)	688 (8.0)	60 (14.0)	47 (8.2)	
Lower middle	4733	30 (32.0)	574 (45.8)	506 (47.7)	3227 (37.6)	166 (38.6)	231 (40.3)	
Upper middle	704	12 (13.2)	70 (5.6)	50 (4.7)	520 (6.0)	22 (5.1)	31 (5.4)	
Upper	5467	36 (39.5)	499 (39.8)	343 (32.4)	4145 (48.3)	182 (42.3)	264 (46.1)	
Government Restrictions[b]	12212	92	1282	1116	8657	433	582	0.045*
Complete restriction	1087 (8.9)	19 (20.6)	84 (6.6)	179 (16.6)	743 (8.6)	43 (9.9)	19 (3.3)	
Somewhat restricted	8093 (66.3)	64 (69.6)	1027 (80.1)	780 (72.5)	5643 (65.2)	264 (61.0)	225 (38.7)	
No restrictions	3032 (24.8)	9 (9.8)	171 (13.3)	117 (10.9)	2271 (26.2)	126 (29.1)	338 (58.0)	

[a]Individuals who reported more than one gender identity were calculated by overall regional count
[b] Denominators excluded individuals who did not respond
[c] p-values were calculated using a one-way analysis of variance (ANOVA) between WHO regions
* Denotes p-value <0.05
** Denotes p-value <0.001

The data also represent samples individuals from some of the most COVID-affected countries globally, including Russia, Brazil, France, and Mexico. Since only descriptive statistics were conducted on the data collected from an anonymous survey, no efforts to reduce potential sources of bias were undertaken. To account for economic, sociopolitical and geographic differences, responses were stratified by WHO region, but no further subgroup analyses were conducted in order to give a broad, descriptive overview of the impact of COVID-19 on the global LGBTQ+ community. Figure 1 highlights the geographic diversity captured by this survey, indicating the global impact of the crisis on members of this community. Majority of respondents were from Europe (70·1%), Americas (10·9%), and Southeast Asia (9·5%), generally reflecting Hornet's user base. Hornet is used by a diverse community, with nearly 25% of users identifying as non-gay.

Mental Health

Given intersecting stigmas and minority stress, LGBTQ+ communities are well known to bear high burdens of mental health conditions· [31–35] 51.4% of individuals reported moderate to severe psychological distress as measured by the PHQ-4 scale (18.0% moderate, 31.4% severe) and there was a statistically significant difference between regions (F(5,18)=34.218), p=0.000). Based on the anxiety and depression subscales (Table 2), 4003 individuals (36.4%) screened

positive for anxiety, and 4639 individuals (41.6%) of individuals screen positive for depression. For both anxiety and depression screens, there was a statistically significant difference between WHO regions, as determined by one-way ANOVA tests ($F(6,7)= 5.266$, $p=0.016$ and $F(6,7)=9.828$ $p=.0004$). Additionally, 40.1% of individuals reported that they felt emotionally unsafe in their current environment and 24.1% physically unsafe and the difference between regions was statistically significant ($F(5,18) = 43.822$, $p=0.000$)

Table 2: Mental health indicators among LGBTQ+ individuals from the COVID-19 Disparities Survey distributed between April 16 and May 4, 2020, stratified by WHO region

Indicator	Overall (%)	Africa	Americas	Southeast Asia	Europe	Eastern Mediterranean	Western Pacific	p-value[c]
Total PHQ-4[b]	10939	79	1153	915	7874	379	539	0.000**
None	3527 (32.2)	21 (26.6)	311 (27.0)	245 (26.8)	2645 (33.6)	107 (28.2)	198 (36.7)	
Mild	2015 (18.4)	15 (19.0)	191 (16.5)	143 (15.6)	1512 (19.2)	89 (23.5)	65 (12.1)	
Moderate	3431 (31.4)	14 (17.7)	440 (38.2)	405 (44.3)	2288 (29.0)	59 (15.5)	225 (41.7)	
Severe	1966(18.0)	29 (36.7)	211 (18.3)	122 (13.3)	1429 (12.2)	124 (32.7)	51 (9.5)	
Anxiety Screen[b]	11006	79	1169	918	7922	379	539	0.005*
Positive	4003 (36.4)	43 (54.4)	463 (39.6)	274 (29.9)	2885 (36.4)	218 (57.5)	120 (22.3)	
Negative	7003 (63.6)	36 (45.6)	706 (60.4)	644 (70.1)	5037 (63.6)	161 (42.5)	419 (77.7)	
Depression Screen[b]	11153	82	1166	942	8031	386	546	0.001**
Positive	4639 (41.6)	48 (41.5)	411 (35.3)	316 (33.5)	3490 (43.5)	226 (41.5)	148 (27.1)	
Negative	6514 (58.4)	34 (58.5)	755 (64.7)	626 (66.5)	4541 (56.5)	160 (58.5)	398 (72.9)	

Current Environment[a,b]	11741	103	1459	1262	9363	536	641	0.000*
Physically Unsafe		25	244	156	2210	147	45	
Emotionally Unsafe		31	476	212	3665	207	120	
Physically safe		38	663	542	3815	124	416	
Emotionally Safe		29	485	323	2533	82	344	
I don't know		11	91	192	1271	71	52	

[a]Question was select all that apply and were calculated by overall regional count
[b] Denominators excluded individuals who did not respond
[c] p-values were calculated using a one-way analysis of variance (ANOVA) between WHO regions
* Denotes p-value <0.05
** Denotes p-value <0.001

Economics and Employment

LGBTQ+ individuals are more likely to be employed in service, sales, and hospitality industries all of which are directly and heavily impacted by the COVID-19 crisis.[7,17,36] The significance of such employment demographics are reflected in the data collected (Table 4), with 23·8% (3,128/13115) of persons responding that they work in either the service or hospitality industries and 13·7% (1625/11,827) indicating that they already lost their job as a result of the COVID-19 crisis. Nearly 50% of individuals indicated that they were not able to completely meet their basic needs (e.g., food, clothing, shelter, transportation, education, and healthcare), which was significant between regions (F(5,24)=12.080, p=0.000). Furthermore, 1 out of every 4 individuals indicated that they have skipped or cut meals, although there was no significant difference between regions. Of those who responded, 1 in every 3 individuals expected at least a 30% reduction in income as a result of COVID-19, the difference of which between regions was significant (F(5,18)=59.1, p=0.000). Lastly, and perhaps most importantly, more than 80% of individuals responded that they had not received financial support from work or government, and 1 in 2 indicated that it was needed (F(5,18)=4.16, p=0.01).

Table 3: Economic and indicators among LGBTQ+ individuals from the COVID-19 Disparities Survey distributed between April 16 and May 4, 2020, stratified by WHO region

Indicator	Overall (%)	Africa	Americas	Southeast Asia	Europe	Eastern Mediterranean	Western Pacific	p-value[c]
Occupation[a,b]	13115	102	1262	1255	9322	533	641	0.000*

Services and sales		19	253	243	1874	69	165	
Skilled agriculture		3	8	35	117	11	9	
Crafts		7	21	35	232	21	12	
Manufacturing plant		6	20	66	471	23	36	
Domestic Work		11	17	19	79	7	10	
Informal		6	39	26	334	8	9	
Underground		5	8	4	32	4	2	
Hospitality		6	44	82	320	23	31	
Professional		23	438	147	2042	109	136	
Artistic		7	91	36	650	28	23	
Armed Forced		4	8	8	97	21	17	
Freelance		6	105	103	283	53	33	
Unemployed		13	129	97	1113	64	47	
Other		17	193	208	1264	61	78	0.08
Not applicable		20	123	79	889	38	61	
Afford to miss work[a,b]	11805	89	920	1030	8478	421	562	0.000*
I already lost my job		10 (11.2)	98 (8.0)	168 (16.3)	846 (10.0)	51 (12.1)	41 (7.3)	
I am on paid leave		3 (3.4)	81 (6.6)	61 (5.9)	605 (7.1)	19 (4.5)	25 (4.4)	
I telecommute (work from home)		13 (14.6)	342 (27.8)	166 (16.1)	1950 (23.0)	55 (13.1)	72 (12.8)	
I was not working before COVID-19		11 (12.4)	104 (8.5)	77 (7.5)	733 (8.6)	43 (10.2)	39 (7.0)	

No, but I am following the confinement measure		22 (24.7)	258 (21.0)	182 (17.7)	1894 (22.3)	110 (26.1)	146 (26.0)	
No, I need to work to survive and cannot stay at home, regardless of COVID-19		10 (11.2)	129 (10.5)	285 (27.7)	1211 (27.7)	82 (19.5)	129 (23.0)	
Not applicable		20 (22.5)	218 (17.7)	91 (8.8)	1239 (8.8)	61 (14.5)	110 (19.6)	
Lost job due to COVID[b]	11827	88	1225	1032	8499	420	563	0.297
Yes	1625 (13.7)	74 (15.9)	1071 (87.4)	187 (18.1)	1164 (13.7)	65 (15.5)	41 (7.23)	
No	10197 (86.3)	14 (84.1)	154 (12.6)	845 (81.9)	7335 (86.3)	355 (84.5)	522 (92.3	
Meet basic needs[b]	11821	90	1229	1029	8496	417	560	0.000**
Not at all	497 (4.2)	5 (5.6)	37 (3.0)	38 (3.7)	352 (4.1)	32 (7.7)	33 (5.9)	
Slightly	1699 (14.4)	19 (21.1)	86 (7.0)	148 (14.4)	1309 (15.4)	86 (20.6)	51 (9.1)	
Somewhat	2995 (25.3)	21 (23.3)	228 (18.5)	213 (20.7)	2249 (26.5)	95 (22.8)	189 (3.8)	
Fairly Well	4037 (34.2)	25 (27.8)	425 (34.6)	346 (33.6)	2975 (35.0)	114 (27.3)	152 (27.1)	
Very well	2593 (21.9)	20 (22.2)	453 (36.9)	284 (27.6)	1611 (19.0)	90 (21.6)	135 (24.1)	
Skipped meals[b]	11828	89	1222	1035	8505	422	555	0.136
I don't know	565 (4.8)	5 (5.6)	33 (2.7)	50 (4.8)	407 (4.8)	44 (10.4)	26 (4.7)	
No	8578	47	987	589 (56.9)	6313	227 (53.8)	415	0.39

	(72.5)	(52.8)	(80.8)		(74.2)		(74.8)	
Yes	2685 (22.7)	37 (41.6)	202 (16.5)	396 (38.3)	1785 (21.0)	151 (35.8)	114 (20.5)	
Income Reduction[b]	11692	86	1219	1030	8395	407	555	0.000**
0%	3691 (31.6)	24 (27.9)	378 (31.0)	188 (18.2)	2813 (33.5)	106 (26.2)	182 (32.8)	
1-29%	2854 (24.4)	11 (12.8)	264 (21.7)	260 (25.2)	2045 (24.3)	86 (21.1)	188 (33.9)	
30-59%	2479 (21.2)	22 (25.6)	309 (25.3)	233 (22.6)	1703 (20.2)	105 (25.7)	107 (19.3)	
60-100%	2668 (22.8)	29 (33.7)	268 (22.0)	349 (34.0)	1834 (22.0)	110 (27.0)	78 (14.0)	
Receive Benefits[b]	9610	76	1095	863	6759	322	495	0.01*
No, but it is needed	4808 (50.0)	41 (54.0)	403 (36.8)	423 (49.0)	3531 (52.2)	181 (56.2)	229 (46.3)	
No, it isn't needed	3121 (32.5)	20 (26.3)	447 (40.8)	148 (17.1)	2263 (33.5)	88 (27.3)	155 (31.1)	
Yes, but it isn't needed	280 (2.9)	0 (0.0)	36 (3.3)	17 (2.0)	189 (2.8)	13 (4.1)	25 (5.0)	
Yes, it is needed	1401 (14.6)	15 (19.7)	209 (19.1)	275 (31.9)	776 (11.5)	40 (12.4)	86 (17.6)	

[a]Question was select all that apply and were calculated by overall regional count

[b] Denominators excluded individuals who did not respond

[c] p-values were calculated using a one-way analysis of variance (ANOVA) between WHO regions

* Denotes p-value <0.05

** Denotes p-value <0.001

Access to Care

There are existing gaps in care for LGBTQ+ individuals, with many being underinsured or lacking insurance entirely. [37–42]Those living in countries without a nationalized health program are left at increased risk for both economic and health-related despair. The high cost of health services that are required when someone becomes infected with COVID-19 further adds to this already heavy burden.[43–47] A majority of individuals indicated that they had access (84.8%) that they had access to masks (Table 3). 4486 (37.9%) individuals reported having

government insurance, 1866 (15.8%) no insurance, and 5475 (46.3%) having insurance from private/employer/other. The differences in insurance between regions was statistically significant ($F(5,12)=9.607$, $p=0.0007$). One-quarter of individuals indicated that they may lose insurance, and the differences in expecting to lose insurance between regions was also significant according to a one-way ANOVA ($F(4,20)=4.540$, $p=0.009$). Access to HIV prevention methods (testing, condoms, PrEP, PEP) has also become more difficult because of the pandemic (Figure 2).

Table 4: Access to Care indicators among LGBTQ+ individuals from the COVID-19 Disparities Survey distributed between April 16 and May 4, 2020, stratified by WHO region

Indicator	Overall (%)	Africa	Americas	Southeast Asia	Europe	Eastern Mediterranean	Western Pacific	p-value[c]
Access to masks[b]	12508	97	1296	1106	8976	444	589	0.176
Yes	10301 (82.4)	80 (82.5)	1089 (84.0)	1046 (95.0)	7171 (79.9)	371 (83.6)	544 (92.0)	
No	2207 (17.6)	17 (17.5)	207 (16.0)	60 (5.0)	1805 (20.1)	73 (16.4)	47 (8.0)	
Healthcare coverage	11827	89	1232	1030	8492	423	561	0.000**
Government insurance	4486 (37.9)	18 (20.2)	385 (31.2)	209 (20.3)	3442 (40.5)	111 (26.2)	321 (57.2)	
No insurance	1866 (15.8)	33 (37.1)	203 (16.5)	272 (26.4)	1192 (14.0)	122 (28.8)	44 (7.8)	
Private/employer/other	5475 (46.3)	38 (42.7)	644 (52.3)	549 (53.3)	3858 (45.5)	190 (44.9)	196 (35.0)	
Lose Insurance[b]	8902	50	996	681	6403	266	506	0.005*
Definitely yes	327 (3.6)	0 (0.0)	28 (2.8)	67 (2.8)	181 (13.8)	20 (7.5)	31 (6.1)	
Probably yes	497 (5.7)	5 (10.0)	72 (7.2)	83 (7.2)	268 (4.2)	24 (9.0)	45 (9.0)	
Might or might not	1378 (15.5)	15 (30.0	170 (17.1)	134 (17.1)	889 (13.9)	60 (22.6)	110 (21.7)	

		)						
Probably not	2511 (28.2)	10 (20.0)	299 (30.0)	160 (30.0)	1867 (29.2)	67 (52.2)	108 (21.3)	0.000*
Definitely not	4189 (47.0)	20 (40.0)	427 (42.9)	237 (42.9	3198 (49.9)	95 (35.1)	212 (41.9)	

[a]Question was select all that apply and were calculated by overall regional count

[b] Denominators excluded individuals who did not respond

[c] p-values were calculated using a one-way analysis of variance (ANOVA) between WHO regions

* Denotes p-value <0.05

** Denotes p-value <0.001

Discussion:

COVID-19 has rapidly emerged as a major public health threat, causing significant global disruption. Growing evidence indicates that the incidence of COVID-19 is higher in communities of lower socioeconomic status, in which LGBTQ+ individuals are over-represented given their long history of economic marginalization.[48–51] Additionally, higher burdens of mental health and infectious diseases -- due to the intersection of upstream determinants such as stigma, criminalization of same-sex practices and sex work, and continued limited investment in these communities -- place LGBTQ+ individuals at even higher risk. [2,13,16] Such compounding vulnerabilities result in earlier disruptions to health services, leading to prolonged periods without access to care, especially during global crises.[31] These impacts are felt more strongly among those further marginalized by society, such as sex workers, racial/ethnic minorities, immigrants, and those lacking access to healthcare. These realities will undoubtedly reinforce the intersectional vulnerabilities that existed before the COVID-19 pandemic.

This descriptive analysis highlights the severe impacts to mental health, access to care, and socioeconomics that members of the LGBTQ+ community are experiencing. Be it the nearly one-quarter of individuals experiencing food insecurity, or the one-half of individuals who have yet to receive financial benefits, despite need. The inability to meet basic needs will likely be exacerbated further for individuals who are unemployed or working in industries most directly impacted by COVID-19. [52] Even among those who have remained employed during the pandemic, reductions in income will likely put additional strain on individuals during an already difficult period.

While most individuals who participated in the survey reported having access to masks, at least one in 5 of individuals were unsure if they would continue to have insurance. Condoms as a means of HIV prevention remained largely accessible despite the pandemic, while at-home HIV testing, PrEP, and PEP were the prevention methods that were most difficult to access during the COVID-19 crisis. This is particularly alarming because members of the LGBTQ+ continue to be disproportionately impacted by HIV globally [20], so these disparities in access to prevention strategies may lead to heightened vulnerability to HIV, especially among minorities, immigrants, and others who may have been forced to engage in sex work due to the pandemic. [53–56] This also has major implications for rates of HIV transmission throughout the duration of the crisis,

where changes in income and employment have been shown to increase HIV risk. [57,58] Furthermore, while this analysis did not examine the impact of COVID-19 on those living with HIV, it's been shown that interruptions to the HIV care continuum may have impacts on community transmission, treatment, and mortality. [59–62] Unless efforts are undertaken to address these disparities in access to methods of prevention, decades of progress may be lost.

Given the wide variation in health care coverage around the world, it should not be forgotten that the 1 in 6 individuals who indicated having no insurance at all. This is of particular importance within the context of the fifty percent of individuals who reported to having moderate and severe psychological distress, as well as those who screened positive for anxiety and/or depression. While there has been a large international focus on the clinical manifestations and treatment for COVID-19, it is worth noting that there is likely an even bigger crisis brewing just under the surface as people continue to experience the psychological distress associated with the response to COVID-19, and our data indicate that members of the LGBTQ+ are no different. With efforts to mitigate this growing mental health crisis, there is a continued need to not only characterize its parameters, but targeted solutions implemented with the utmost urgency.

These findings highlight important considerations in the wake of this pandemic. It is evident that there is a growing need to mitigate the impacts of this crisis by circumventing traditional models of care to ensure continuity and achieve long-term health outcomes. Telemedicine continues to show promise as a way to ensure individuals have continued care, allowing for patient-provider interactions while minimizing the risk of new COVID-19 transmission events. [63–66] Additionally, mobile health (mHealth) strategies will become even more important to keep in touch and regularly check-in with patients now that in-person contact is largely discouraged. [67,68] While access to in-person HIV testing remains moderately accessible according to our analysis, moving forward it will be crucial to implement strategies that limit the need to travel and possible interactions with the general public, such as delivery of at-home testing kits, drop-off testing, or even mobile testing. Even if improvements in the use of technology for care continue, without addressing the digital divide that persists in many communities the world, it is likely that the most vulnerable among us will remain increasingly vulnerable and may even further exacerbate existing disparities. [69–71] Additionally, these findings indicate the need to develop more robust and targeted approaches for regional differences and sub-populations. Economic support, HIV prevention, and mental health services will remain pivotal moving forward, and while targeted and tailored, individual-level interventions are necessary, they will likely not be enough. Structural and policy changes which prioritize public health and address the systemic barriers that individuals in this community continue to face are necessary to ensure economic and health equity long-term.

For countries where there is higher acceptability of LGBTQ+ people, this may begin with disaggregating data by sexual orientation and gender identity at the local, sub-national, and national levels. In many countries around the world, no data is collected on these communities, and short of researchers using novel methods to estimate population size these individuals would otherwise, "not count". [72,73] For countries with less favorable views, it will require recognition of this community, eliminating criminalizing policies on same-sex behavior and sex work, extending the right to marry for same-sex couples, and establishing laws that bestow legal protection to members of this marginalized community throughout society. [13,74,75]

Notably, there are some limitations of this study. Individuals must be users of Hornet in order to participate in the survey, and thus must have internet and smartphone access, limiting generalizability of the findings to a target population of interest. Additionally, emerging evidence indicates that COVID-19 is having a larger impact on those of lower socioeconomic status (i.e. without internet or smartphone access); therefore it is possible that this underestimates the true magnitude of the pandemic on more marginalized individuals in these communities. Even so, prior studies have documented the success of using social networking platforms to reach hidden and stigmatized populations. It is also possible that barriers such as language or stigma, led particular subgroups to not participate or complete the survey in its entirety, resulting in non-response bias. To mitigate this, we plan to translate later iterations of the study into additional languages. Meaning that further studies, including but not limited to qualitative interviews, will be required to characterize the impact of the COVID-19 crisis further. As well, this is a convenience sample and cross-sectional in nature, so may not be representative of the whole LGBTQ+ community and precludes our ability to examine temporality in the outcomes we analyzed.

Despite these limitations, the novel use of a rapid survey among users of a social network application provides insight into the effects felt by the LGBTQ+ community in real-time, when it may otherwise be infeasible to collect such information as scale. Collectively, these results reflect the impact that the pandemic will have on the LGBTQ+ community, and the need for continued monitoring and policy action as the COVID-19 crisis progresses.

Conclusion:

These findings represent individuals from 136 countries around the world and highlight the clear immediate and secondary effects of COVID-19 on LGBTQ+ communities, while emphasizing the need for additional data to guide future programs and policies. If not for surveys of this kind, which leverages a global social network and app-based technology, we would be unable to obtain this quantity of accurate, and real-time information on how marginalized communities are being impacted by the pandemic, nor at this level of granularity. This novel, technology-based approach highlights the profoundly detrimental impact that COVID-19 is having and will continue to have on LGBTQ+ communities, thereby underscoring the need for a data-driven and timely response, both immediately and in the wake of this crisis.

References

1 Dong E, Du H, Gardner L. An interactive web-based dashboard to track COVID-19 in real time. *The Lancet Infectious Diseases* 2020;**20**:533–4. doi:10.1016/S1473-3099(20)30120-1

2 Santos G-M, Ackerman B, Rao A, *et al.* Economic, Mental Health, HIV Prevention and HIV Treatment Impacts of COVID-19 and the COVID-19 Response on a Global Sample of Cisgender Gay Men and Other Men Who Have Sex with Men. *AIDS Behav* 2020;:1–11. doi:10.1007/s10461-020-02969-0

3 Jarrett BA, Peitzmeier SM, Restar A, *et al.* Gender-affirming care, mental health, and economic stability in the time of COVID-19: a global cross-sectional study of transgender and non-binary people. *medRxiv* 2020;:2020.11.02.20224709. doi:10.1101/2020.11.02.20224709

4 Hall KS, Samari G, Garbers S, *et al.* Centring sexual and reproductive health and justice in the global COVID-19 response. *The Lancet* 2020;**395**:1175–7. doi:10.1016/S0140-6736(20)30801-1

5 Thomas Hale, Samuel Webster. Oxford COVID-19 Government Response Tracker. Published Online First: 2020.https://apo.org.au/node/303043

6 DeMulder J, Kraus-Perrotta C, Zaidi H. Sexual and gender minority adolescents must be prioritised during the global COVID-19 public health response. *null* 2020;**28**:1804717. doi:10.1080/26410397.2020.1804717

7 Kawohl W, Nordt C. COVID-19, unemployment, and suicide. *The Lancet Psychiatry* 2020;**7**:389–90. doi:10.1016/S2215-0366(20)30141-3

8 Jiang H, Zhou Y, Tang W. Maintaining HIV care during the COVID-19 pandemic. *The Lancet HIV* 2020;**7**:e308–9. doi:10.1016/S2352-3018(20)30105-3

9 Poteat TC, Reisner SL, Miller M, *et al.* COVID-19 Vulnerability of Transgender Women With and Without HIV Infection in the Eastern and Southern U.S. *medRxiv* 2020;:2020.07.21.20159327. doi:10.1101/2020.07.21.20159327

10 Barnert E, Ahalt C, Williams B. Prisons: Amplifiers of the COVID-19 Pandemic Hiding in Plain Sight. *Am J Public Health* 2020;**110**:964–6. doi:10.2105/AJPH.2020.305713

11 Koh D. Migrant workers and COVID-19. *Occup Environ Med* 2020;**77**:634. doi:10.1136/oemed-2020-106626

12 Kline NS. Rethinking COVID-19 Vulnerability: A Call for LGTBQ+ Im/migrant Health Equity in the United States During and After a Pandemic. *Health Equity* 2020;**4**:239–42. doi:10.1089/heq.2020.0012

13 Wallach S, Garner A, Howell S, *et al.* Address Exacerbated Health Disparities and Risks to LGBTQ+ Individuals during COVID-19. *Health Hum Rights* 2020;**22**:313–6.

14 Banerjee D, Rao TSS. Sexuality, sexual well being, and intimacy during COVID-19 pandemic: An advocacy perspective. *Indian J Psychiatry* 2020;**62**:418–26. doi:10.4103/psychiatry.IndianJPsychiatry_484_20

15 Fraser B, Pierse N, Chisholm E, *et al.* LGBTIQ+ Homelessness: A Review of the Literature. *Int J Environ Res Public Health* 2019;**16**:2677. doi:10.3390/ijerph16152677

16 Hutchcraft ML, Teferra AA, Montemorano L, *et al.* Differences in Health-Related Quality of Life and Health Behaviors Among Lesbian, Bisexual, and Heterosexual Women Surviving Cancer from the 2013 to 2018 National Health Interview Survey. *LGBT Health* 2021;**8**:68–78. doi:10.1089/lgbt.2020.0185

17 Raifman J, Bor J, Venkataramani A. Unemployment insurance and food insecurity among people who lost employment in the wake of COVID-19. *medRxiv* 2020;:2020.07.28.20163618. doi:10.1101/2020.07.28.20163618

18 Salerno JP, Williams ND, Gattamorta KA. LGBTQ populations: Psychologically vulnerable communities in the COVID-19 pandemic. *Psychological Trauma: Theory, Research, Practice, and Policy* 2020;**12**:S239–42. doi:10.1037/tra0000837

19 Hogan AB, Jewell BL, Sherrard-Smith E, *et al.* Potential impact of the COVID-19 pandemic on HIV, tuberculosis, and malaria in low-income and middle-income countries: a modelling study. *The Lancet Global Health* 2020;**8**:e1132–41. doi:10.1016/S2214-109X(20)30288-6

20 UNAIDS data 2019. 2019. https://www.unaids.org/en/resources/documents/2019/2019-UNAIDS-data (accessed 1 Feb 2021).

21 Jewell BL, Mudimu E, Stover J, *et al.* Potential effects of disruption to HIV programmes in sub-Saharan Africa caused by COVID-19: results from multiple mathematical models. *Lancet HIV* 2020;**7**:e629–40. doi:10.1016/S2352-3018(20)30211-3

22 The Lancet Hiv. When pandemics collide. *Lancet HIV* 2020;**7**:e301–e301. doi:10.1016/S2352-3018(20)30113-2

23 Logie CH, Lacombe-Duncan A, Brien N, *et al.* Barriers and facilitators to HIV testing among young men who have sex with men and transgender women in Kingston, Jamaica: a qualitative study. *J Int AIDS Soc* 2017;**20**:21385–21385. doi:10.7448/IAS.20.1.21385

24 Agénor M, Pérez AE, Koma JW, *et al.* Sexual Orientation Identity, Race/Ethnicity, and Lifetime HIV Testing in a National Probability Sample of U.S. Women and Men: An Intersectional Approach. *LGBT Health* 2019;**6**:306–18. doi:10.1089/lgbt.2019.0001

25 Rael CT, Martinez M, Giguere R, *et al.* Barriers and Facilitators to Oral PrEP Use Among Transgender Women in New York City. *AIDS Behav* 2018;**22**:3627–36. doi:10.1007/s10461-018-2102-9

26 Duffus WA, Davis HT, Byrd MD, *et al.* HIV Testing in Women: Missed Opportunities. *Journal of Women's Health* 2011;**21**:170–8. doi:10.1089/jwh.2010.2655

27 Schweighardt B, Ortiz GM, Grant RM, *et al.* Emergence of drug-resistant HIV-1 variants in patients undergoing structured treatment interruptions. *AIDS* 2002;**16**.https://journals.lww.com/aidsonline/Fulltext/2002/11220/Emergence_of_drug_resistant_HIV_1_variants_in.18.aspx

28 Cohen MS, Chen YQ, McCauley M, *et al.* Antiretroviral Therapy for the Prevention of HIV-1 Transmission. *N Engl J Med* 2016;**375**:830–9. doi:10.1056/NEJMoa1600693

29 =Strategies for Management of Antiretroviral Therapy (SMART) Study Group, El-Sadr W, Lundgren JD, *et al.* CD4+ count-guided interruption of antiretroviral treatment. *The New England journal of medicine* 2006;**355**:2283–96. doi:10.1056/nejmoa062360

30 Kroenke K, Spitzer RL, Williams JBW, *et al.* An Ultra-Brief Screening Scale for Anxiety and Depression: The PHQ–4. *Psychosomatics* 2009;**50**:613–21. doi:10.1016/S0033-3182(09)70864-3

31 Fredriksen-Goldsen KI, Simoni JM, Kim H-J, *et al.* The health equity promotion model: Reconceptualization of lesbian, gay, bisexual, and transgender (LGBT) health disparities. *Am J Orthopsychiatry* 2014;**84**:653–63. doi:10.1037/ort0000030

32 Bockting WO, Miner MH, Swinburne Romine RE, *et al.* Stigma, mental health, and resilience in an online sample of the US transgender population. *Am J Public Health* 2013;**103**:943–51. doi:10.2105/AJPH.2013.301241

33 Feinstein BA, Goldfried MR, Davila J. The relationship between experiences of discrimination and mental health among lesbians and gay men: An examination of internalized homonegativity and rejection sensitivity as potential mechanisms. *Journal of Consulting and Clinical Psychology* 2012;**80**:917–27. doi:10.1037/a0029425

34 Balsam KF, Molina Y, Beadnell B, *et al.* Measuring multiple minority stress: the LGBT People of Color Microaggressions Scale. *Cultur Divers Ethnic Minor Psychol* 2011;**17**:163–74. doi:10.1037/a0023244

35 Fredriksen-Goldsen KI, Emlet CA, Kim H-J, *et al.* The physical and mental health of lesbian, gay male, and bisexual (LGB) older adults: the role of key health indicators and risk and protective factors. *Gerontologist* 2013;**53**:664–75. doi:10.1093/geront/gns123

36 The Economic Impact of COVID-19 on the LGBTQ Community. HRC. https://www.hrc.org/resources/the-economic-impact-of-covid-19-on-the-lgbtq-community (accessed 4 Feb 2021).

37 Dahlhamer JM, Galinsky AM, Joestl SS, *et al.* Barriers to Health Care Among Adults Identifying as Sexual Minorities: A US National Study. *Am J Public Health* 2016;**106**:1116–22. doi:10.2105/AJPH.2016.303049

38 Buchmueller T, Carpenter CS. Disparities in health insurance coverage, access, and outcomes for individuals in same-sex versus different-sex relationships, 2000-2007. *Am J Public Health* 2010;**100**:489–95. doi:10.2105/AJPH.2009.160804

39 Radix A, Maingi S. LGBT Cultural Competence and Interventions to Help Oncology Nurses and Other Health Care Providers. *Seminars in Oncology Nursing* 2018;**34**:80–9. doi:10.1016/j.soncn.2017.12.005

40 Macapagal K, Bhatia R, Greene GJ. Differences in Healthcare Access, Use, and Experiences Within a Community Sample of Racially Diverse Lesbian, Gay, Bisexual, Transgender, and Questioning Emerging Adults. *LGBT Health* 2016;**3**:434–42. doi:10.1089/lgbt.2015.0124

41 Qureshi RI, Zha P, Kim S, *et al.* Health Care Needs and Care Utilization Among Lesbian, Gay, Bisexual, and Transgender Populations in New Jersey. *null* 2018;**65**:167–80. doi:10.1080/00918369.2017.1311555

42 Injustice at Every Turn: A Report of the National Transgender Discrimination Survey. National LGBTQ Task Force. 2011.https://www.thetaskforce.org/injustice-every-turn-report-national-transgender-discrimination-survey/ (accessed 4 Feb 2021).

43 Yamin M. Counting the cost of COVID-19. *Int J Inf Technol* 2020;:1–7. doi:10.1007/s41870-020-00466-0

44 Bartsch SM, Ferguson MC, McKinnell JA, *et al.* The Potential Health Care Costs And Resource Use Associated With COVID-19 In The United States. *Health Affairs* 2020;**39**:927–35. doi:10.1377/hlthaff.2020.00426

45 Liu Y, Lee JM, Lee C. The challenges and opportunities of a global health crisis: the management and business implications of COVID-19 from an Asian perspective. *Asian Business & Management* 2020;:1–21. doi:10.1057/s41291-020-00119-x

46 Khan JR, Awan N, Islam MM, *et al.* Healthcare Capacity, Health Expenditure, and Civil Society as Predictors of COVID-19 Case Fatalities: A Global Analysis. *Front Public Health* 2020;**8**:347–347. doi:10.3389/fpubh.2020.00347

47 Tan-Torres Edejer T, Hanssen O, Mirelman A, *et al.* Projected health-care resource needs for an effective response to COVID-19 in 73 low-income and middle-income countries: a modelling study. *The Lancet Global Health* 2020;**8**:e1372–9. doi:10.1016/S2214-109X(20)30383-1

48 Emlet CA. Social, Economic, and Health Disparities Among LGBT Older Adults. *Generations* 2016;**40**:16–22.

49 Patel JA, Nielsen FBH, Badiani AA, *et al.* Poverty, inequality and COVID-19: the forgotten vulnerable. *Public Health* 2020;**183**:110–1. doi:10.1016/j.puhe.2020.05.006

50 Corburn J, Vlahov D, Mberu B, *et al.* Slum Health: Arresting COVID-19 and Improving Well-Being in Urban Informal Settlements. *Journal of Urban Health* 2020;**97**:348–57. doi:10.1007/s11524-020-00438-6

51 Abrams EM, Szefler SJ. COVID-19 and the impact of social determinants of health. *Lancet Respir Med* 2020;**8**:659–61. doi:10.1016/S2213-2600(20)30234-4

52 Charlton BM, Gordon AR, Reisner SL, *et al.* Sexual orientation-related disparities in employment, health insurance, healthcare access and health-related quality of life: a cohort study of US male and female adolescents and young adults. *BMJ Open* 2018;**8**:e020418–e020418. doi:10.1136/bmjopen-2017-020418

53 Baral SD, Friedman MR, Geibel S, *et al.* Male sex workers: practices, contexts, and vulnerabilities for HIV acquisition and transmission. *Lancet* 2015;**385**:260–73. doi:10.1016/S0140-6736(14)60801-1

54 Santos G-M, Makofane K, Arreola S, *et al.* Reductions in access to HIV prevention and care services are associated with arrest and convictions in a global survey of men who have sex with men. *Sex Transm Infect* 2017;**93**:62. doi:10.1136/sextrans-2015-052386

55 Santos G-M, Do T, Beck J, *et al.* Syndemic conditions associated with increased HIV risk in a global sample of men who have sex with men. *Sex Transm Infect* 2014;**90**:250. doi:10.1136/sextrans-2013-051318

56 Martinez O, Brady KA, Levine E, *et al.* Using Syndemics Theory to Examine HIV Sexual Risk Among Latinx Men Who Have Sex with Men in Philadelphia, PA: Findings from the National HIV Behavioral Surveillance. *EHQUIDAD* 2020;**13**:217–36. doi:10.15257/ehquidad.2020.0009

57 Maulsby CH, Ratnayake A, Hesson D, *et al.* A Scoping Review of Employment and HIV. *AIDS Behav* 2020;**24**:2942–55. doi:10.1007/s10461-020-02845-x

58 Delpierre C, Cuzin L, Lauwers-Cances V, *et al.* Unemployment as a risk factor for AIDS and death for HIV-infected patients in the era of highly active antiretroviral therapy. *Sex Transm Infect* 2008;**84**:183. doi:10.1136/sti.2007.027961

59 Chenneville T, Gabbidon K, Hanson P, *et al.* The Impact of COVID-19 on HIV Treatment and Research: A Call to Action. *Int J Environ Res Public Health* 2020;**17**:4548. doi:10.3390/ijerph17124548

60 Mitchell KM, Dimitrov D, Silhol R, *et al.* Estimating the potential impact of COVID-19-related disruptions on HIV incidence and mortality among men who have sex with men in the United States: a modelling study. *medRxiv* 2020;:2020.10.30.20222893. doi:10.1101/2020.10.30.20222893

61 Pinto RM, Park S. COVID-19 Pandemic Disrupts HIV Continuum of Care and Prevention: Implications for Research and Practice Concerning Community-Based Organizations and Frontline Providers. *AIDS Behav* 2020;:1–4. doi:10.1007/s10461-020-02893-3

62 Prabhu S, Poongulali S, Kumarasamy N. Impact of COVID-19 on people living with HIV: A review. *J Virus Erad* 2020;**6**:100019. doi:10.1016/j.jve.2020.100019

63 Mgbako O, Miller EH, Santoro AF, *et al.* COVID-19, Telemedicine, and Patient Empowerment in HIV Care and Research. *AIDS Behav* 2020;**24**:1990–3. doi:10.1007/s10461-020-02926-x

64 Touger R, Wood BR. A Review of Telehealth Innovations for HIV Pre-Exposure Prophylaxis (PrEP). *Current HIV/AIDS Reports* 2019;**16**:113–9. doi:10.1007/s11904-019-00430-z

65 Rogers BG, Coats CS, Adams E, *et al.* Development of Telemedicine Infrastructure at an LGBTQ+ Clinic to Support HIV Prevention and Care in Response to COVID-19, Providence, RI. *AIDS Behav* 2020;**24**:2743–7. doi:10.1007/s10461-020-02895-1

66 Langarizadeh M, Tabatabaei MS, Tavakol K, *et al.* Telemental Health Care, an Effective Alternative to Conventional Mental Care: a Systematic Review. *Acta Inform Med* 2017;**25**:240–6. doi:10.5455/aim.2017.25.240-246

67 Wong KYK, Stafylis C, Klausner JD. Telemedicine: a solution to disparities in human immunodeficiency virus prevention and pre-exposure prophylaxis uptake, and a framework to scalability and equity. *Mhealth* 2020;**6**:21–21. doi:10.21037/mhealth.2019.12.06

68 Catalani C, Philbrick W, Fraser H, *et al.* mHealth for HIV Treatment & Prevention: A Systematic Review of the Literature. *Open AIDS J* 2013;**7**:17–41. doi:10.2174/1874613620130812003

69 Blandford A, Wesson J, Amalberti R, *et al.* Opportunities and challenges for telehealth within, and beyond, a pandemic. *The Lancet Global Health* 2020;**8**:e1364–5. doi:10.1016/S2214-109X(20)30362-4

70 Campbell BR, Ingersoll KS, Flickinger TE, *et al.* Bridging the digital health divide: toward equitable global access to mobile health interventions for people living with HIV. *null* 2019;**17**:141–4. doi:10.1080/14787210.2019.1578649

71 Bakhtiar M, Elbuluk N, Lipoff JB. The digital divide: How COVID-19's telemedicine expansion could exacerbate disparities. *J Am Acad Dermatol* 2020;**83**:e345–6. doi:10.1016/j.jaad.2020.07.043

72 Baral S, Turner RM, Lyons CE, *et al.* Population Size Estimation of Gay and Bisexual Men and Other Men Who Have Sex With Men Using Social Media-Based Platforms. *JMIR Public Health Surveill* 2018;**4**:e15–e15. doi:10.2196/publichealth.9321

73 Cahill SR, Makadon HJ. If They Don't Count Us, We Don't Count: Trump Administration Rolls Back Sexual Orientation and Gender Identity Data Collection. *LGBT Health* 2017;**4**:171–3. doi:10.1089/lgbt.2017.0073

74 Beyrer C. Pushback: the current wave of anti-homosexuality laws and impacts on health. *PLoS Med* 2014;**11**:e1001658–e1001658. doi:10.1371/journal.pmed.1001658

75 Marks SM. Global recognition of human rights for lesbian, gay, bisexual, and transgender people. *Health Hum Rights* 2006;**9**:33–42.

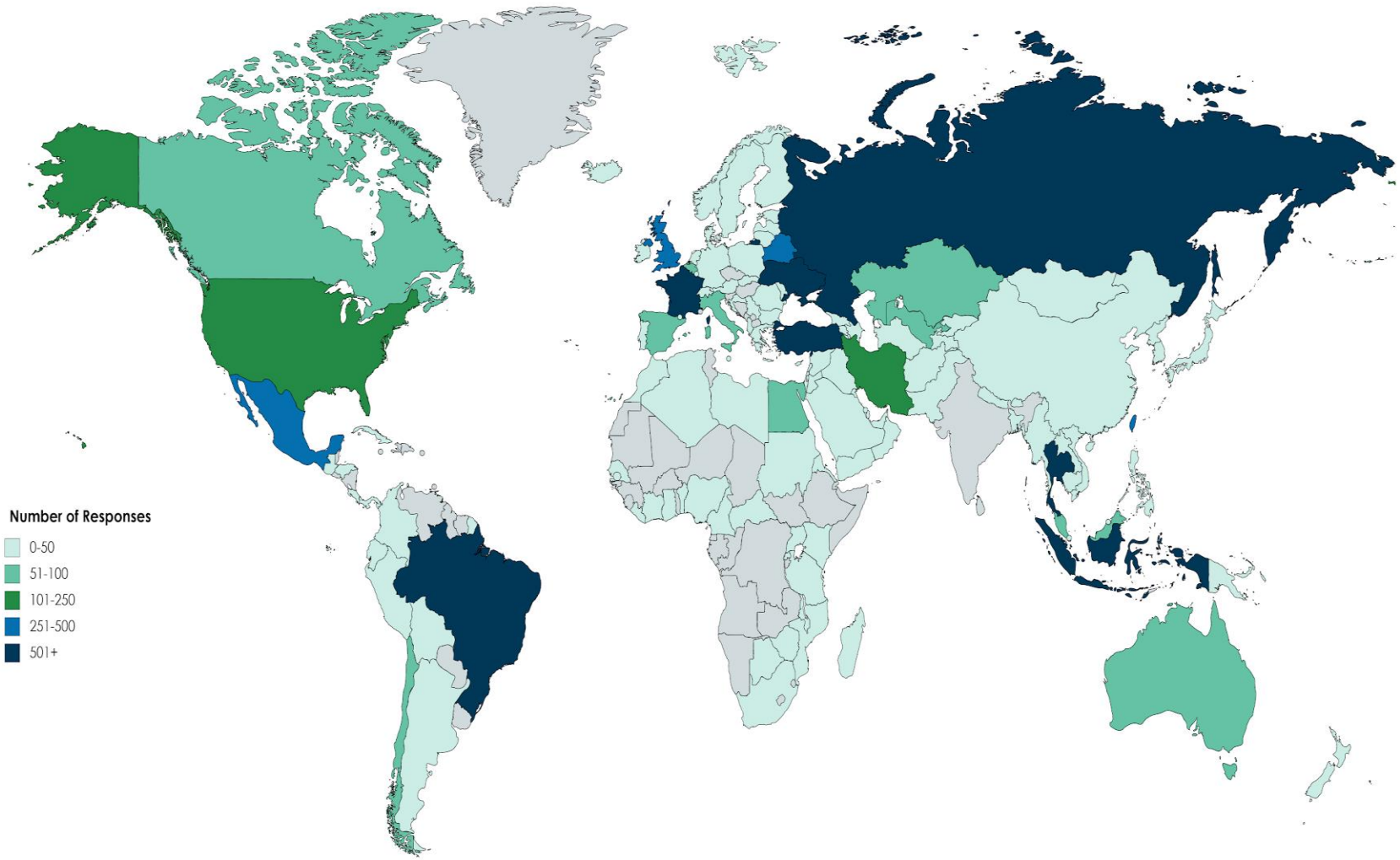
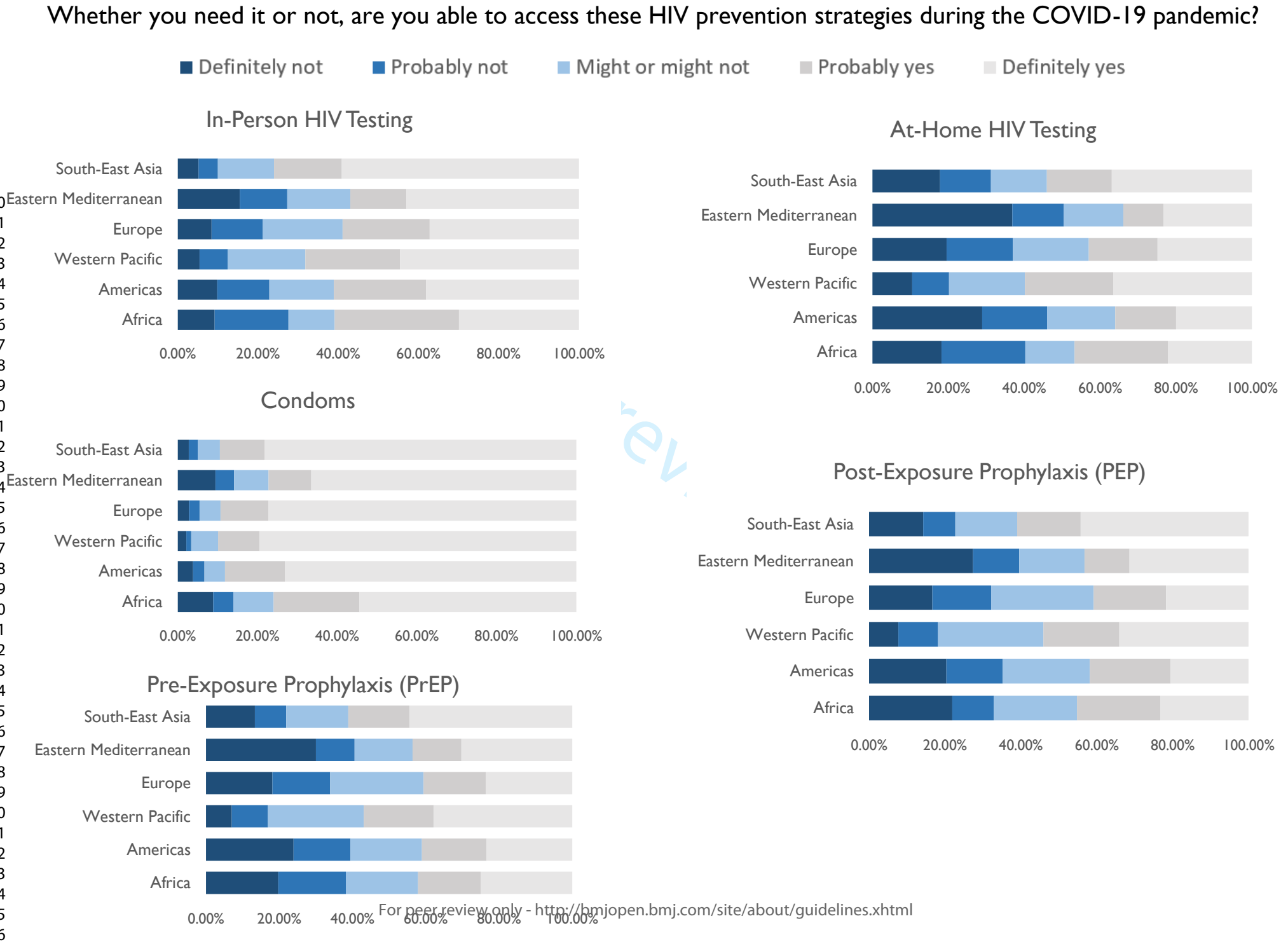

Number of Responses
0-50
51-100
101-250
251-500
501+

Figure 2: Access to HIV prevention strategies for LGBTQ+ persons from from the COVID-19 Disparities Survey distributed between April 16 and May 4, 2020, stratified by WHO region



STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No	Recommendation
Title and abstract	1✓	(*a*) Indicate the study's design with a commonly used term in the title or the abstract
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found
Introduction		
Background/rationale	2✓	Explain the scientific background and rationale for the investigation being reported
Objectives	3✓	State specific objectives, including any prespecified hypotheses
Methods		
Study design	4✓	Present key elements of study design early in the paper
Setting	5✓	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection
Participants	6✓	(*a*) *Cohort study*—Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up *Case-control study*—Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls *Cross-sectional study*—Give the eligibility criteria, and the sources and methods of selection of participants
		(*b*) *Cohort study*—For matched studies, give matching criteria and number of exposed and unexposed *Case-control study*—For matched studies, give matching criteria and the number of controls per case
Variables	7✓	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable
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
Bias	9✓	Describe any efforts to address potential sources of bias
Study size	10✓	Explain how the study size was arrived at
Quantitative variables	11✓	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why
Statistical methods	12✓	(*a*) Describe all statistical methods, including those used to control for confounding
		(*b*) Describe any methods used to examine subgroups and interactions
		(*c*) Explain how missing data were addressed
		(*d*) *Cohort study*—If applicable, explain how loss to follow-up was addressed *Case-control study*—If applicable, explain how matching of cases and controls was addressed *Cross-sectional study*—If applicable, describe analytical methods taking account of sampling strategy
		(*e*) Describe any sensitivity analyses

Continued on next page

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
			(b) Give reasons for non-participation at each stage
			(c) Consider use of a flow diagram
Descriptive data	14*	✓	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders
			(b) Indicate number of participants with missing data for each variable of interest
			(c) *Cohort study*—Summarise follow-up time (eg, average and total amount)
Outcome data	15*		*Cohort study*—Report numbers of outcome events or summary measures over time
		✓	*Case-control study*—Report numbers in each exposure category, or summary measures of exposure
			Cross-sectional study—Report numbers of outcome events or summary measures
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
		✓	(*b*) Report category boundaries when continuous variables were categorized
			(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period
Other analyses	17	✓	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses
Discussion			
Key results	18	✓	Summarise key results with reference to study objectives
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
Interpretation	20	✓	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence
Generalisability	21	✓	Discuss the generalisability (external validity) of the study results
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

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

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.