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Viewpoint

Monkeypox outbreaks and global health emergency declaration: Can such declarations influence public interest in the disease?

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Respected Editors,

As the world attempts to recover from the COVID-19 pandemic, the expansive and rapid spread of Monkeypox (MPX) disease has generated profound media and scientific activity. Since May 2022, multi-country MPX outbreaks in non-endemic countries have been reported and within three months (by early August 2022), more than 30,000 cases were reported in more than 85 countries (Centers for Disease Control and Prevention, 2022). Public health scholars and policy experts called for urgent and coordinated global efforts to contain the spread of MPX, strengthening surveillance, facilitation of scientific cooperation, and planning and preparedness for testing and vaccination (Taylor, 2022; Nuzzo et al., 2022; Wenham and Eccleston-Turner, 2022). Along with these calls, some experts also questioned the delay in declarations of a public health emergency by national and global organizations (Taylor, 2022; Blumental and Gostin, 2022). Despite the criticisms and calls, the WHO declared MPX outbreaks a Public Health Emergency of International Concern more than two months after the initial global spike in cases (Nuzzo et al., 2022; Wenham and Eccleston-Turner, 2022). There has been a long-standing debate about the process, rationale, and impact of such declarations. For example, there are questions about the responsibilities of individual UN member countries, whether they should also declare an emergency following PHEIC declaration promptly, and if such declarations lead to better disease control and prevention regionally and globally (Taylor, 2022; Wenham and Eccleston-Turner, 2022; 2022).

Given the lack of empirical evidence on the influence of PHEIC declarations, we wanted to assess the impact of the MPX PHEIC declaration on the nature and extent of the general publics' interest in the disease in the U.S. To assess the extent of changes in the public interest in MPX disease in the U.S., a rapid Infodemiology analysis was conducted using *Google Trends* data (GT comprises of all the google searches

on a particular topic by people in a region). We explored Google search trends in the U.S. on “*Monkeypox*” from July 13 – August 1, 2022 (covering ten days before and after the July 23rd, 2022 WHO PHEIC declaration for MPX). GT provides the data as relative search volumes (RSV) ranging from 0 (lowest search interest) to 100 (maximum search interest) for the topic/term in a particular location (Bhagavathula et al., 2022b; Bhagavathula et al., 2022a). GTs also provides data on the top search items that have shown significant popularity growth during the date range specified, compared to the preceding period. To assess the nature of changes in the public interest in MPX disease in the U.S., we explored the top 5 rising Google search terms related to MPX before and after the PHEIC declaration on MPX. Joinpoint regression model was applied to identify trends in public interest in MPX disease for each segment (the period before and after PHEIC declaration) through daily search percentage changes (DSPC) (with 95 % confidence intervals). The number of segments was chosen according to the best fit indicated by the algorithm. The average daily percentage change (ADPC) represents the overall percentage change in Google searches in the U.S. for MPX disease before and after the PHEIC declaration by the WHO.

The period following the WHO declaration of the current MPX outbreak as a PHEIC corresponded with the greatest number of Google searches on “*Monkeypox*” in the U.S., with a significant increase in the ADPC of 10.7 % (95 % CI: 5.1–16.5, $P < 0.001$) [Fig. 1]. Searches were cumulatively 351.3 % (95 % CI: 343.0–359.5) higher than expected following the WHO announcement. A major increase in the online searches on MPX occurred between July 21 – 24, 2022, with an ADPC of 48.5 % (95 % CI: 0.6 – 119.3), and then the online searches significantly increased by 6.7 % (95 % CI: 2.2–11.3) until August 1, 2022 [Supplementary Table]. When delineated by states for change in searches on MPX after PHEIC declaration, the top 5 states with the greatest increase in search volumes were Mississippi, Florida, Illinois, Idaho, and Nevada.

Abbreviations: MPX, Monkeypox; CDC, Centers for Disease Control and Prevention; WHO, World Health Organization; UN, United Nations; PHEIC, Public Health Emergency of International Concern; GT, Google Trends; RSV, Relative Search Volumes.

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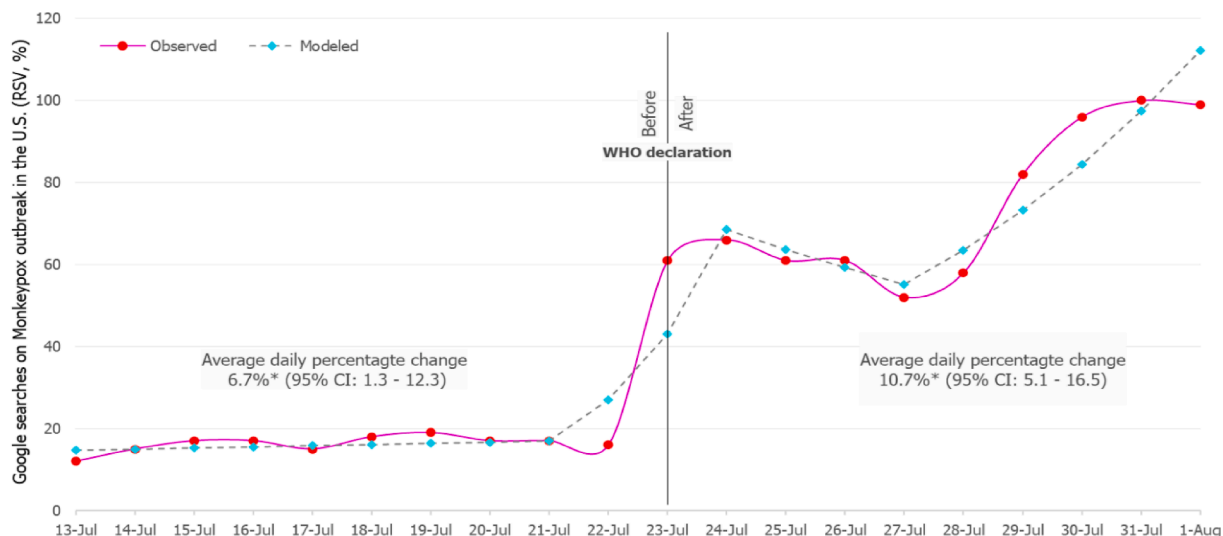


Fig. 1. U.S Public Internet Searches on Monkeypox Disease Before and After the PHEIC Declaration by WHO.

Table 1

Rising 5 Queries for MPX Disease and Corresponding Percentage Changes in Searches.

Before WHO PHEIC Declaration	After WHO PHEIC Declaration
Monkey Pox San Antonio (500 %)	Monkeypox vaccine requirements (Breakout)
Monkey Pox Alabama (400 %)	Can you die from Monkeypox 2022 (900 %)
Monkeypox Louisville KY (400 %)	Monkeypox cases by state (800 %)
Monkeypox Polio (350 %)	How to avoid getting Monkeypox (750 %)
Monkeypox virus disease outbreak (300 %)	Who is at risk for Monkeypox (450 %)

Interestingly, only one of these states was among the top 5 in the nation for the number of MPX cases (i.e., New York, California, Florida, Texas, and Georgia had the highest number of MPX cases during the period of this analysis) (Centers for Disease Control and Prevention, 2022). This could mean that it was probably not the rising number of cases in states that led to a statewide increase in internet search volumes for MPX disease. Finally, in the period before the MPX PHEIC declaration by the WHO (July 13–22, 2022), the public google search terms that experienced the greatest increase in the U.S were related to the virus spreading in various regions of the U.S. (Table 1). In contrast, after the PHEIC declaration (July 22–August 1, 2022), the searches that gained popularity were mostly related to individuals seeking information on risk and prevention of MPX (e.g., vaccination requirements or how to avoid getting the disease) [Table 1].

The results of our analysis suggest that the WHO PHEIC declaration for MPX disease was associated with an increase in the Americans’ interest in MPX disease. Given the lack of empirical evidence on the benefits and influence of PHEIC-type declarations, our results demonstrate the potential impact of these declarations, create a foundation for future studies, and also pose additional questions. It remains to be seen how long these declarations impact public interest in disease outbreaks and can such declarations also change the behavior of the general public (in addition to increasing awareness). Also, if people continue to search for information, a critical examination of online information sources on MPX is needed to curb misinformation and ensure that people get reliable/accurate information on disease prevention. For example, a recent analysis of online videos suggests that more than a tenth of these videos contained misinformation about MPX disease (Ortiz-Martínez et al., 2022; Bhagavathula et al., 2022a). Above all, given the results from our analysis and the potential benefits of declaring an emergency, the key

questions that need to be answered are whether agencies like the WHO and the U.S. Government missed an opportunity to prevent the rampant transmission of MPX? Should these agencies have declared a global or national emergency sooner? Did we repeat the same mistakes from the early phases of the COVID-19 pandemic?

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data is available publicly at Google Trends

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.bbi.2022.08.009>.

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