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GETTING AHEAD OF MONKEYPOX: Learning from the COVID-19 pandemic experience to prevent the potentially new monkeypox pandemic

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Abstract

As the caseloads of monkeypox virus (MPXV) infection are steadily increasing worldwide, the World Health Organization has recently declared it a global outbreak. There are no specific drugs or vaccines against monkeypox, however, smallpox vaccines and smallpox antivirals could be used to prevent a global MPXV pandemic. This editorial examines some of the currently employed prophylactic and therapeutic strategies against this virus. Additionally, information on former and newly established surveillance methods like the Sewer Coronavirus Alert Network (SCAN) have been examined as a way to improve surveillance against MPXV and how best to utilize knowledge learned from the ongoing COVID-19 pandemic to prevent potential twin viral pandemics.

Monkeypox virus (MPXV), a re-emerging zoonotic virus that causes monkeypox disease, is an orthopoxvirus that is endemic to West and Central Africa, but it was unexpectedly detected early this year in non-endemic countries in Europe and North America, among others (1). With more than 35,000 confirmed cases reported worldwide so far, the number of cases will likely continue to rise as additional surveillance and diagnostics are made available for screening purposes (2). As many countries around the globe are still combating the current COVID-19 pandemic, a positive outcome of these efforts is that public health officials and epidemiologists in many countries and communities are better prepared with the tools, resources, and general knowledge when it comes to preventing another global viral outbreak, such as the monkeypox outbreak that has recently been declared by the World Health Organization (WHO) and by other public health agencies (1).

There are no specific drugs or vaccines against monkeypox, however, smallpox vaccines and smallpox antivirals could be used to prevent a MPXV pandemic (3). Based on similarities between smallpox and monkeypox viruses, the previously developed smallpox vaccines could protect against MPXV. The smallpox vaccines called JYNNEOS™ and ACAM2000®

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are the only two licensed smallpox vaccines in the United States that could be used against monkeypox. The Aventis Pasteur Smallpox Vaccine (APSV) could be used with an Investigational New Drug (IND) application when neither of the licensed vaccines are available (4), although it is not known how effective the APSV is against MPXV. Previous studies with other orthopoxviruses have shown that smallpox antivirals, such as Brincidofovir and Cidofovir, could be used to treat MPXV, however, like the APSV, there is a knowledge gap regarding their effectiveness against MPXV (5–7). With a finite supply of the available smallpox vaccines and a risk that the spread of MPXV could outpace production of the necessary vaccines to prevent virus transmission, vaccine distribution must be strategic and effective to prevent the potential global pandemic of monkeypox. In the early days of the COVID-19 pandemic, there were shortages of medical supplies, treatments, and vaccines (8). Learning from the COVID-19 experience, it is prudent to advocate for additional public resources (e.g., funds, testing infrastructures, and front-line workers, etc.) that can be made available to target the identified areas of need as well as to vaccinate and provide the necessary treatment to those communities with high MPXV case numbers, such as men who have sex with men or those with high-risk sexual behaviors (9). Another strategy to predict and therefore prevent a disease outbreak is through an active surveillance effort.

In 2020, the COVID-19 pandemic led to the generation of the Sewer Coronavirus Alert Network (SCAN) (10). This surveillance program aimed to test wastewater to identify communities and populations where SARS-CoV-2, which is the causative agent of COVID-19, was present. Early in the COVID-19 pandemic, voluntary testing was the primary method used to record data about positive cases. The main shortcoming of this method was that a SARS-CoV-2-infected individual must take the initiative to get tested to have any data recorded. As use of masks and vaccinations became more commonplace, it prevented people from getting severely sick, and in turn, cutting down on the number of hospitalizations and tests needed to track the spread of the SARS-CoV-2 virus. Additionally, as governments started providing communities with at-home test kits, many positive or negative tests did not get reported to government agencies, and surveillance of new strains took longer to become known. By using samples of wastewater to detect the SARS-CoV-2 virus, genomics labs were able to look at viral spread more accurately among different cities and communities. Being able to anticipate spikes in caseloads has helped inform the local communities about new cases and/or new virus variant(s) that might emerge in their individual community (11). Since June 2022, SCAN has added other viruses to their surveillance system, and MPXV is one of them. They have been able to detect MPXV in water plants across the United States (10). These environmental and community-based MPXV surveillance efforts need to be continued and expanded. Additionally, this surveillance network could be used in combination with phylogenomic analysis to provide insight of the current MPXV spread and evolution (12). While some might argue that looking at wastewater data is more reactive than proactive, it can help anticipate the spread of the virus and give front-line workers a chance to control the outbreak and prevent the emergence of the potentially new monkeypox pandemic.

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