

Letter to the Editor

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Nyiragongo Volcano's Eruption Amidst the COVID-19 Pandemic in the Democratic Republic of Congo: A Crisis Within a Crisis

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The Democratic Republic of Congo (DRC), which is the second-largest country in Africa, has been significantly affected by the coronavirus disease 2019 (COVID-19) pandemic with a total number of 55,877 cases and 1061 deaths recorded as of September 8, 2021. However, to date, only 111,142 vaccine doses have been administered.¹ The epicenter of the COVID-19 pandemic in the DRC and the focal point of global humanitarian efforts is its capital city, Goma. Goma is surrounded by 6 volcanoes, including Mount Nyiragongo, one of the most active and deadly volcanoes worldwide, which had previously erupted in 1977 and 2002, with more than 600 and 250 casualties, respectively.² On May 22, Mount Nyiragongo erupted again, compounding the COVID-19 crisis being faced by the nation, impacting on the healthcare infrastructure, resource allocation, and management of COVID-19 patients. This article highlights the dual impact of the current COVID-19 public health crisis and disaster response to Mount Nyiragongo's eruption. It further explores related economic setbacks, internal displacement of peoples, increase in COVID-19 transmission, and a triad of other issues.

The first COVID-19 case in the DRC was detected on March 10, 2020, after which the Congolese government declared a state of emergency and set up a national committee to create strategies to tackle the pandemic. The strategies adopted included a complete lockdown, raising awareness, restricting flights and prohibiting mass gatherings. However, the DRC was ill equipped to handle the situation, with only 1 reference laboratory in addition to a lack of diagnostic devices, personal protective equipment's, and medical personnel.³ Furthermore, the COVID-19 pandemic occurred at a time when the country was facing a serious Ebola and measles epidemic,⁴ resulting in the reallocation of available medical resources, thus, negatively affecting the management of these 2 public health challenges. In this context, the public response to containment policies has been unfavorable, with approximately half of the population not adhering to guidelines, such as regular hand-washing and social distancing. This may be due to lower education level, being jobless, poverty, or living with other people at home.⁵ Also, it is reported that 25% of the population believed that COVID-19 did not exist, and only 50% of the population was willing to be vaccinated.⁶ This includes health-care workers, where only approximately 27.7% agreed to vaccinate themselves when vaccines are available.⁷

Volcanic eruptions cause the discharge of different pollutants into the air, including sulfur dioxide (SO₂), which can cause irritation of the skin and mucous membranes, and acute and chronic respiratory disorders, among others. This may lead to migrations and home displacement due to a possible increase in mortality rates associated with short-term exposure to outdoor SO₂.⁸ Moreover, volcanic lava has been shown to cause thyroid cancer. Different studies have found a relationship between volcanic lava in the Pacific Ocean areas, including Vanuatu, French Polynesia, and New Caledonia and increased cases of thyroid cancer of the papillary histotype.⁹ The volcanic phenomenon also affects the environment and the economy through the destruction of bridges, farmlands, and homes, as well as may cause human injuries through the flow of lava and pyroclastic flow.^{10,11} In addition, volcanic degassing releases carbon monoxide (CO), which forms an atmospheric brown fog that disrupts agriculture and directly causes inflation of food prices.^{8,11}

Goma is situated at the Congo-Rwanda border, which is one of the world's most occupied borders, with a daily traffic of tens of thousands of people passing by on foot. The eruption of Mount Nyiragongo further complicates this problem by displacing residents and increasing the number of migrants, which may inadvertently amplify the spread of COVID-19 if adequate

measures are not taken.¹⁰ Because of limited time and equipment for mass COVID-19 testing at the Congo-Rwanda border, there is a need to implement strategic evacuation plans that allow the smooth and efficient transportation of citizens while maintaining COVID-19 safety protocols, as well as setting up camps that can act as shelters and isolation sites to limit the spread of the disease.

Overall, this will require more health-care personnel and partnerships between hospitals near the border to provide medical services, documentation, and surveillance for other diseases, including the Ebola and measles epidemics. Although the United Nations Refugee Agency is providing relief items and shelter, more funding will be urgently needed, especially in the face of a 4.7 magnitude earthquake nearby on May 25, 2021, which has resulted in the destruction of several buildings.¹² Additionally, installing early warning systems will help the evacuation process as the lava flows slowly and predictably.

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