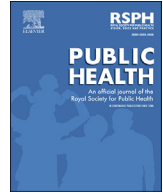




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## Letter to the Editor

## COVID-19 and mass gatherings: emerging and future implications of the Brazilian carnival for public health



The current Coronavirus Disease 2019 (COVID-19) outbreak, caused by the viral, zoonotic pathogen named Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), has caused an evolving global public health and economic crisis. This viral pandemic was first reported in December 2019 in Wuhan, Hubei province, China. About two months later, it was declared as a Public Health Emergency of International Concern (PHEIC) by the World Health Organization (WHO) on January 30, 2020. Like has been shown in other countries worldwide, Brazil was also dramatically affected by the current pandemic, and declared COVID-19 as a public health emergency on February 3, 2020.

As a result of insufficient efforts made by the government, up to date, Brazil is considered the Latin America's worst-hit country by COVID-19 pandemic, and became the world's 2nd country in cases, overcoming the milestone of two million cases. On July 26, 2020, the Brazilian Ministry of Health, through the Health Surveillance Secretariat, confirmed a total of 2,419,091 cases and 87,004 deaths.<sup>1</sup> Despite the record of COVID-19 surges as the world has seen, the following issue is on the rise in the country: what are the implications of the current COVID-19 outbreak for the celebration of the Brazilian carnival in 2021?

The Brazilian carnival is one of the most famous annual mass gatherings in the country, which is responsible for attracting millions of people from different states and nationalities, as well as by injecting billions of reals into the economy. According to data released by the Brazilian Ministry of Tourism, the carnival in 2020 was marked by records, in which the cities of Salvador, São Paulo, and Rio de Janeiro registered an average of 16.5, 15.0, and 6.4 million of people, respectively.<sup>2,3</sup> During the celebration, the country commonly also received foreign tourists, mainly from Argentina, France, United States of America (USA), Germany, Spain, and England.<sup>2</sup>

São Paulo, Rio de Janeiro, and Salvador - three of the main carnival destinations in Brazil - have shown a constant and alarming increase in the number of cases and deaths by COVID-19 during the last few months as shown in Fig. 1. Therefore, this Brazilian event calls for extreme concern and highlights an unprecedented threat to global health. This note gains special attention due to the high transmission rate presented by SARS-CoV-2, which can be transmitted by contact with infected individuals, including symptomatic,<sup>4,5</sup> presymptomatic,<sup>6</sup> and asymptomatic<sup>7</sup> individuals. Corroborating this, the present Journal recently has published an article that addressed this issue. Wu et al. (2020),<sup>8</sup> through a retrospective

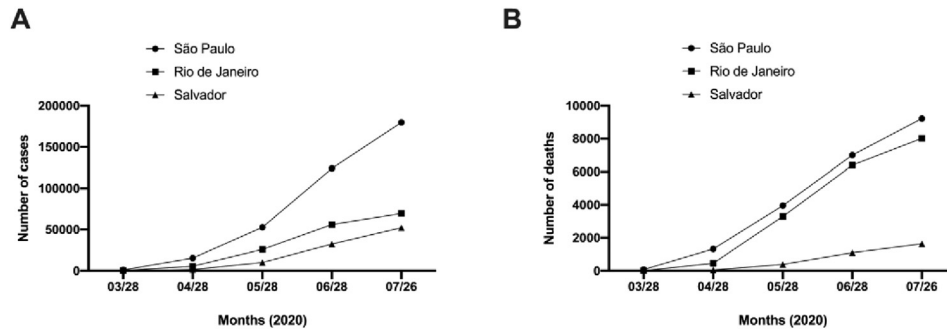
cohort study, showed that the form and frequency of contacts are the determining factors for the SARS-CoV-2 transmission.

Huang et al. (2020)<sup>9</sup> in a prospective contact-tracing study showed that SARS-CoV-2 could be transmitted quickly by asymptomatic individuals during the incubation period. In addition, another route of transmission may involve contamination of the air and the environment surface by patients infected with SARS-CoV-2 through their respiratory droplets and possibly by fecal shedding.<sup>5</sup> Therefore, the Brazilian public authorities need to take into account each peculiarity about the modes and times of viral transmission before making a decision regarding the approval of the carnival in 2021, a public event where the social distancing is almost unattainable.

Another concern that needs to be raised is related to the role of travelers in the rapid spread of COVID-19. Zheng et al. (2020)<sup>10</sup> showed a significant and positive correlation between the frequency of imported cases via flights, trains, and buses with the number of COVID-19 cases. Thus, if the Brazilian carnival is held in 2021, it will probably bring together people from different regions and nationalities, which would potentialize, at the same time, travelers bringing the virus to the event or taking it to their cities.

It is essential to highlight that the current COVID-19 outbreak is ongoing worldwide, and from an international perspective, maybe it is too early to discuss the future course of this pandemic in Brazil, a country that has failed to address the coronavirus pandemic in any meaningful way. Due to the lack of antiviral therapy and vaccine availability, public health measures to control the current coronavirus pandemic remains based on classical control of epidemics, such as physical distancing, the use of masks, environmental decontamination, and hygiene measures. In contrast, mass meetings, such as carnival, are marked by numerous social behaviors that are extremely incompatible with the health measures adopted to face COVID-19.

Despite the recent augmentation in discussions by the Brazilian authorities on whether or not to hold this event scheduled for February 12–26, 2021, to date, only the government of São Paulo decided to postpone the carnival, suggesting that the celebrations may be held in May or July of 2021.<sup>11</sup> However, it is not the first time that the Brazilian carnival has been postponed. In 1892 and 1912, despite the postponement of the celebration, the population did not accept the change and celebrated on both dates: the official and the new one that had been determined.<sup>11</sup> Thus, the postponement of the carnival does not guarantee that



**Fig. 1.** (A) Number of cases and (B) deaths caused by the current COVID-19 pandemic in the Brazilian cities of São Paulo, Rio de Janeiro, and Salvador during the months of March to July of 2020. The number of cases and deaths were obtained from the 'Brazilian Ministry of Health. Coronavirus Brazil'.<sup>1</sup>

the celebrations will not be made by the population on the date initially proposed.

At the moment, dates seem to be on the distant horizon, but the scenario is increasingly unpredictable. On July 15, 2020, the dean of the Federal University of São Paulo (UNIFESP) stated that the apparently most effective vaccine against COVID-19 developed by the University of Oxford from the United Kingdom, which has been tested in Brazil, may have its registration only in June 2021.<sup>12</sup> In this current scenario, the cancellation or postponement of the carnival in 2021 are key determinants of the outbreak expansion, as well as for the pandemic mitigation. Postponing the carnival, without effective medical countermeasures available or complete immunization of the population, represents considerable public health challenges for Brazilian health authorities and federal government, and requires considerable preparation and multifaceted public health interventions.

If the decision is made to proceed with the carnival, the Brazilian health authorities should take into account some recommendations for managing public health aspects, based on the main planning recommendations for mass meetings developed by the WHO<sup>13</sup> and in accordance with technical guidance on COVID-19<sup>14</sup> during the current COVID-19 outbreak (see Box 1). However, if the carnival is allowed, mitigating the current pandemic will be a huge public health challenge for Brazil.

#### Box 1

Proposed public health recommendations during the carnival in the context of the current COVID-19 outbreak.<sup>13,14</sup>

- Event organizers must provide advance warnings and recommendations to participants about the outbreaks in the region, highlighting the risks to which they would be exposed.
- Disclose public health messages specific to COVID-19.
- Provide information on event cancellation and limitations on the number of people.
- Encourage social distance, the use of masks, and periodic hand hygiene.
- Ensure adequate decontamination of avenues, streets, hotels, restaurants, airports, bus stations, and others.
- Health authorities should provide measures of prevention and accompaniment of travelers.
- Support the establishment of a postcarnival surveillance system to quickly diagnose, provide rapid epidemiological data, manage and treat all ill persons.

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