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COVID-19 infection during the Olympic and Paralympic Games Tokyo 2020

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Dear Editor,

From July to September 2021, the Olympic Games Tokyo 2020 (OGT) and Paralympic Games Tokyo 2020 (PGT) were held after a one-year postponement. The number of participants from outside Japan was estimated as 71,000, including 11,656 OGT and 4403 PGT athletes [1].

Two core infection control strategies applied in these events were bubble scheme and frequent testing. Bubble scheme consists of a series of measures which separate participants from the general public. Athletes were not allowed to travel outside of accommodations and competition venues [2]. Further, they were only allowed to use transportation systems prepared for these events and can only contact with a pre-submitted list of individuals [2]. With regards to a testing strategy, athletes and officials received daily quantitative saliva antigen test and subsequent saliva real-time polymerase chain reaction (RT-PCR) test following positive antigen test. Other personnel received regular but a varying frequency of saliva RT-PCR test depending on a degree of contacts with athletes [2]. In addition, athletes and personnel from abroad were also required to take two COVID-19 tests such as RT-PCR and quantitative antigen tests within 96 hours of their flight's departure, take quantitative saliva antigen test on arrival, and quarantine and daily quantitative saliva antigen or saliva RT-PCR tests for the first three days [2].

In addition to these measures, vaccination was encouraged, no spectators were allowed, and face mask-wearing were required for all individuals. With regards to vaccination, more than 80% of athletes and staff were vaccinated while the vaccination was not set as mandatory.

Even after the 3rd emergency declaration was lifted on June 21, 2021, the number of daily severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) positive cases continued to increase from 236 on June 21 to 503 on July 12, resulting in the fourth state of emergency declaration for Tokyo by the Japanese government on that day. However, the number of positive cases in Tokyo continued to increase and culminated to 5908 on August 13.

While there are anecdotal reports by some experts and mass media that infection control strategies during the OGT/PGT were relatively successful, a comprehensive analysis should be performed by taking into account the overall infection trend in Tokyo. Here, we describe the

number of PCR-positive SARS-CoV-2 cases among the OGT/PGT athletes and personnel and residents in Tokyo (Fig. 1) [3].

From June 29 to September 8, 2021, more than one million tests were performed for the participants, and 41 OGT/PGT athletes and 822 OGT/PGT non-athlete personnel were confirmed SARS-CoV-2 positive [4]. The estimated incidence was 0.24% [28/11,656] for the OGT athletes, and 0.30% [13/4403] for the PGT athletes. Of 41 athletes, no detailed information was available for 17 cases, only one cluster was identified in 5 Greek OGT artistic swimming members, and 19 were sporadic throughout various sports. All of them were non-Japanese, and 40 positive cases (97.6%) were detected during the 14-days quarantine at arrival, and only one Italian rowing player was confirmed after the quarantine.

For personnel with SARS-CoV-2 in the OGT and PGT, 68.2% and 74.4% were Japanese. Thus, approximately 0.34% [146/43,000] of the foreign OGT non-athletes and 0.56% [67/12,000] of the foreign PGT non-athletes were infected during the study period. Also, a temporal trend of confirmed positive cases in non-athlete personal and Tokyo residents corresponded in a visual inspection.

Among the general residents in Tokyo during the same period, 186,448 residents, equal to 1.33% of the total population in Tokyo, were confirmed as PCR-positive, despite the percentage of the population fully vaccinated increased from 8.4% to 44.0%. Nine hundred fourteen thousand nine hundred forty-four tests were carried out, and a high positive test rate of 20.4% was recorded. According to mutation screening test by the Tokyo Metropolitan Government, the proportion of SARS-CoV-2 with the L452R mutation, considered to be the delta variant, increased from 21.5% (June 28 to July 4) to 94.0% (August 23 to August 29) among the cases [3].

As an extent of the infection related to the OGT/PGT was much lower than that in Tokyo, we consider that the infection control measures during the OGT/PGT was relatively successful. However, it is unfortunate that at least 21 athletes could not take part in the events, and there are some possible factors that were not adequately covered by the infection control measures taken at the OGT/PGT.

First, the virus may have been brought into the bubble system by the Japanese OGT/PGT personnel, given that the range of activities was not limited among them, as suggested by the fact that they occupied more

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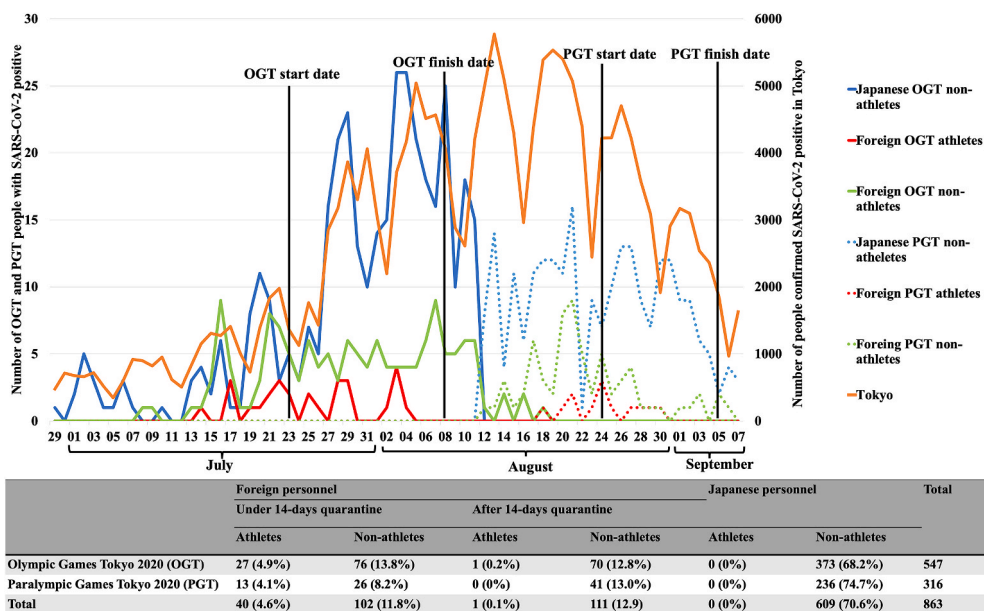


Fig. 1. Temporal trend of cases with confirmed SARS-CoV-2 infection among OGT/PGT athletes, OGT/PGT personnel and Tokyo residents, Japan. OGT: Olympic Games Tokyo 2020; PGT: Paralympic Games Tokyo 2020. Non-athletes included Games-concerned personnel, Media, Tokyo 2020 employees, Tokyo 2020 contractors, and Tokyo 2020 volunteers. “Foreign” personnel indicate non-residents of Japan in this study.

than 60% of total positive cases. Second, given that the bubble system relies on the hypothesis that droplets transmit SARS-CoV-2 from an infected neighbouring individual, airborne transmission of SARS-CoV-2 may not have been fully taken into account [5]. Further genetic investigation on the route of transmission would enable more effective infection control measures [6]. Lastly, vaccination was not mandatory among the athletes and personnel, and it may have contributed to the increased positive cases. It is quite important to share these lessons from the OGP/PGT to the Beijing Olympic Games held in February 2022 as well as other future mass gathering sports events.

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Declaration of competing interest

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