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A rapid surge of the Omicron variant's sublineages BQ.1/BQ.1.1: A matter of worry amid the crucial trajectory of the COVID-19 pandemic

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Dear Editor,

Recently, a plethora of novel Omicron subvariants, such as BQ.1, BQ.1.1, BA.4.6, BF.7, and BA.2.75.2 apart from BA.1, BA.1.1, BA.2, BA.3, BA.4 and BA.5, have appeared as a result of the ongoing evolution of the most mutated strain of severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2)[1–3]. The prevalence of novel immune-evading coronavirus disease-2019 (COVID-19) variants BQ.1 and BQ.1.1 has rapidly increased in England, with the incidence of cases virtually tripling in the previous week alone. BQ.1 currently accounts for over 10% of all coronavirus cases in the England, while BQ.1.1 accounts for more than 3% for a total of 13.3%, in accordance with the most current statistics from the Centers for Disease Control and Prevention, USA. Recent data showed that the number of COVID-19 cases had practically doubled at that point, which can be associated with the emergence of BQ.1/BQ.1.1. The increase in BQ.1 and BQ.1.1 instances is broadly consistent with what is happening across the rest of the England, where cases increased above the 15% from 10%. Additionally, the COVID-19 cases in the New York increased from 20 to 28% owing to the BQ.1/BQ.1.1 sublineages of the Omicron variant. Importantly, BQ.1.1, and BQ.1 subvariants have not shown any indications of increased severity, although it is quite early to provide any concrete statements regarding their infectiousness and transmissibility[4].

BQ.1 and BQ.1.1 sublineages have been identified by the European Centre for Disease Prevention and Control as variants of interest as of October 20, 2022[5]. Additionally, this variant is a component of the highly mutated variant of SARS-CoV-2, that is, Omicron, which has been extensively studied all over the world. It has been postulated that the BQ.1 has evolved from the BA.5 sublineage of the Omicron variant. Interestingly, as of now BA.5 is the most dominant variant all the world. BQ.1 has distinctive mutations such as K444T and N460K in the receptor-binding domain of the spike (S)-protein. Additionally, the BQ.1.1 subvariant that is in circulation has the extrareceptor-binding domain modification R346T. Nextstrain has classified BQ.1 and its sublineages as belonging to clade 22E of the Omicron variant, which is the fastest emerging clade of the SARS-CoV-2 (Fig. 1A).

It has been postulated that these subvariants including BQ.1 and BQ.1.1 might have originated in central or western Africa and then migrated to Europe and other regions of the globe. Preliminary research investigated the neutralisation of mutant pseudoviruses by sera from people who had had three CoronaVac vaccinations and had previously contracted either BA.1, BA.2, or BA.5. When compared to BA.5, BQ.1, and BQ.1.1 in this test using convalescent sera from BA.5 had lower neutralizing activity by a factor of 3.8 and 6.7, respectively[6]. The same preprint demonstrates that, in contrast to BA.5, BQ.1 is resistant to other therapeutic monoclonal antibodies, such as Evusheld and bebtelovimab. It is important to note that, there are no publications that report that antivirals such as Paxlovid have less activity against BQ.1 and BQ.1.1[6]. Hence, the future studies required to uncover the antiviral potentialities of such drugs.

A recent preprint research looked at the neutralisation resistance of BQ.1 and BQ.1.1 subvariants, as well as their ancestors' BA.4/5, BA.2.75, against sera from three-dose vaccines among medical personnel, hospitalized BA.1-wave patients, and BA.5 wave patients. Researchers found that all new subvariants were resistant to neutralisation, particularly the BQ.1 and BQ.1.1 subvariants, which were predominantly driven by a characteristic mutation like N460K. Additionally, the N460K mutation was associated with the enhancement of fusogenicity and S-protein processing in the novel BQ.1 and BQ.1.1 subvariants. Interestingly, R346T, K444T, and F486S mutations were shown to be responsible for enhanced immune evasion of these novel subvariants. Such results together give insight into the worrying development of recently discovered SARS-CoV-2 Omicron subvariants, including BQ.1/BQ.1.1[1].

According to the Scripps Institute, it is extremely difficult to forecast whether this winter will see the emergence of novel variants and sublineages. As of now, the omicron subvariants, such as the BQ.1 and BQ.1.1, have been predicted as emerging lineages of the SARS-CoV-2 because of their gradual increase over the earlier subvariants (Fig. 1B). However, there is no guarantee that the virus will always develop slowly. This virus is still changing. Therefore, it is certainly worth monitoring these

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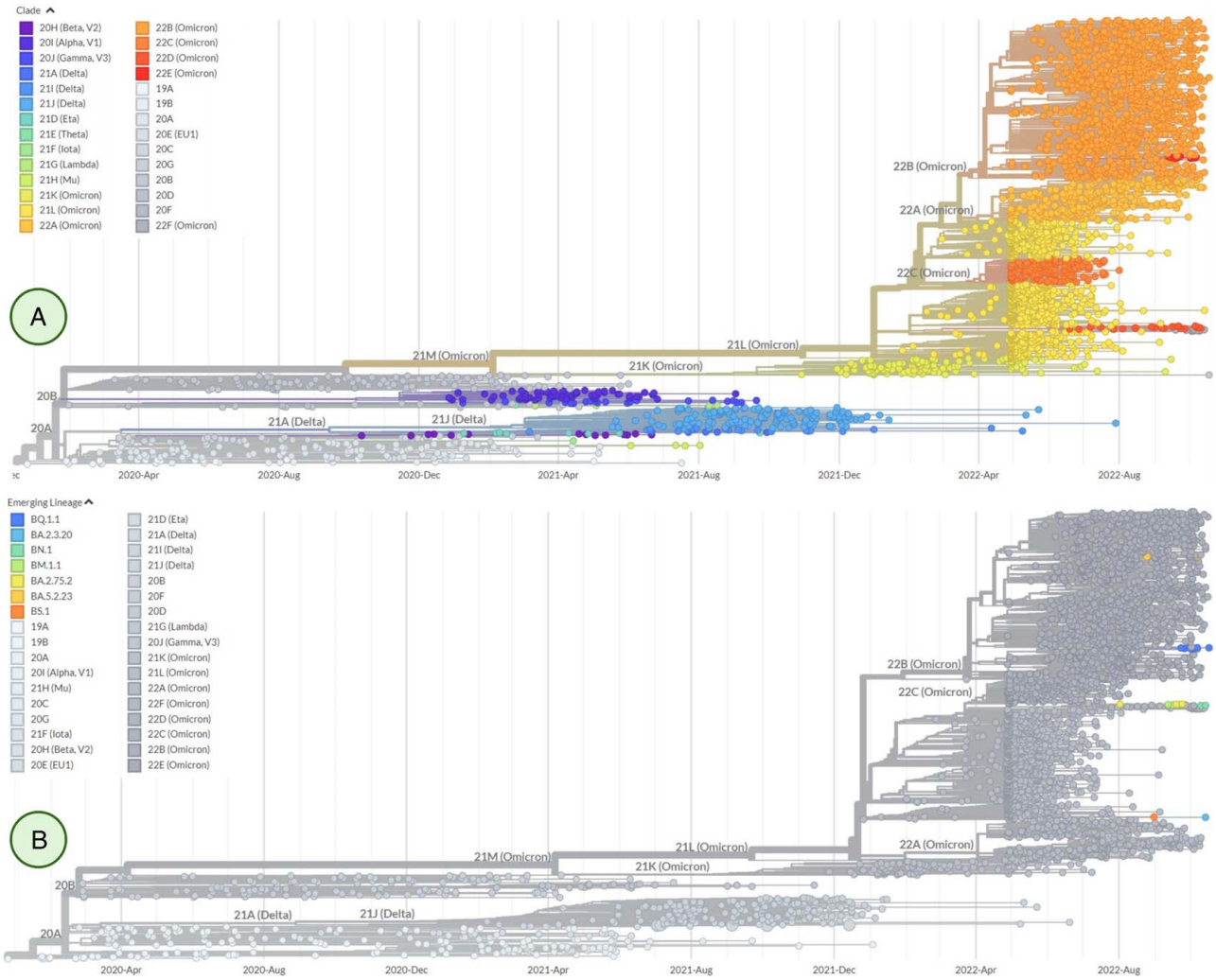

Figure 1. (A) Representing the BQ.1 and its sublineages as belonging to clade 22E of the Omicron variant. (B) The rapid emergence of the novel sublineage BQ.1.1 of the omicron variant which has been postulated to be originated from the BA.5 sublineage of the Omicron variant. Source: Nextstrain/ncov/gisaid/global/6m.

variants very closely because new subvariants should be expected often. However, the issue of whether a novel variant is really of public health concern or only noteworthy on a technical level that specialists would like to debate, and monitoring will always persist[7].

Hence, it is essential to provide the vaccine for all those people who have not completed the basic course and first booster dose of the COVID-19 vaccine. It is essential to improve the vaccination rate, particularly among populations with a higher risk of developing serious illness and in nations with lower vaccination rates. For the current autumn/winter vaccination campaigns, an additional booster dose (e.g. a second or subsequent booster dose having followed the primary course) should also be made available, with a focus on those who are most at risk of developing severe disease, such as elderly people, immunocompromised individuals, those with underlying medical conditions, and pregnant women. Healthcare professionals should also be regarded as one of the priority groups, together with long-term care facility residents and employees[8,9].

Emphasizing on providing the booster doses of the vaccine before or at the beginning of a viral outbreak, especially at the start or during the cold season, would be highly desirable[10]. Combining programmes for COVID-19 and influenza immunization should also be taken into account. It will be important to re-evaluate these factors on a regular basis based on how the epidemiology changes, especially the continued dominance of the Omicron variant sublineage BQ.1 and the upcoming variant-specific data on the effectiveness of vaccinations[9]. Many nations have made substantial changes to their vaccination programmes since the Omicron variant first emerged, including the suggestion that large populations get a third or even fourth booster dosage of the vaccine to prevent any possible side effects. In England, COVID-19 hospitalization rates may be decreased with the boosters and maintained below the current levels for at least 2 years amid the severe challenges facing by National Health Service of England[11].

Ethical approval

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Conflicts of interest disclosure

The authors declare no competing interests.

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