

Letter to the Editor

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The Impact of Russia's War in Ukraine on the SARS-CoV-2 Evolution

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In response to the article by Vuorio et al.,¹ I would like to offer the following in support of their conclusion and to further stress the need for vaccinating the refugee population.

Ukraine has had low severe acute respiratory coronavirus 2 (SAR-CoV-2) vaccination rates (34.3%).² This abysmal vaccination rate and war now result in unvaccinated refugees undergoing forced migrating into vaccinated populations, posing a global threat of a SARS-CoV-2 evolution.

As surrounding areas shift from heterogeneous to homogeneous populations as Ukrainian refugees begin assimilating into populations, the evolution of SARS-CoV-2 will occur within the unvaccinated population in the background of a vaccinated population, and natural selection may favor a variant resistant to the vaccine.^{3,4} This forced migration of over 7 million Ukrainian refugees is dispersing millions of unvaccinated and potential carriers of SARS-CoV-2 across a highly vaccinated continent.^{2,5} Most Ukrainian refugees (59%) have undergone forced migration to countries in similar latitudes, notably Russia and Poland, but also south of the Balkans and Turkey (Fig. 1). Overall, refugees have been pushed across Europe—notably Germany—and the world. Immune genetics differ by geography and demographics throughout human populations, with European variations primarily determined by latitude.⁶ Thus, the further Ukrainian refugees travel, the more genetic diversity and the less risk of viral evolution, as viral escape of T-cell immunity is only a concern in genetically similar populations.⁷ The similar genetic diversity of Ukraine's neighboring populations, such as Russia and Poland, presents the problem of viral evolution that could occur as the virus is transmitted back and forth between persons with a lack of genetic diversity and between unvaccinated, naturally infected, and vaccinated persons.

The largely unvaccinated status of the Ukrainian refugees circulating in vaccinated countries accepting refugees is most concerning—meaning the virus might quickly “learn” to evade the response elicited by those vaccinated. Such evolution could be compounded further by the threat of Ukrainians returning to Ukraine with novel variants, particularly at the conflict's conclusion.

As refugees move throughout neighboring European nations, many will, unfortunately, be transmitting and carrying SARS-CoV-2, allowing the virus the opportunity to increase fitness as it passes back and forth between strong (vaccinated), partial (naturally infected), and weak (unvaccinated) immune responses. One of the most dangerous situations is someone with partial immunity, as this allows selective pressure to be applied to the virus until it gets strong enough to be passed on. This rapid transmission between vaccinated, naturally infected, and unvaccinated and the likely increased contact by refugees with more species, will allow unique variants and mutations to evolve.⁸

This war and refugee crisis is a danger to the world. It contradicts and juxtaposes why we need to eliminate vaccine inequality: to curtail this virus's rapid evolution. This war, like vaccine inequality, poses a significant risk to the world and offers SARS-CoV-2, along with other viruses mitigated with primary prevention vaccines that are being missed by displaced persons, the unique opportunity to propagate and evolve. This potential viral evolution could produce the next SARS-CoV-2 Variant of Concern and bring back the days of lockdowns, masks, and vulnerable populations experiencing waning immunity.³

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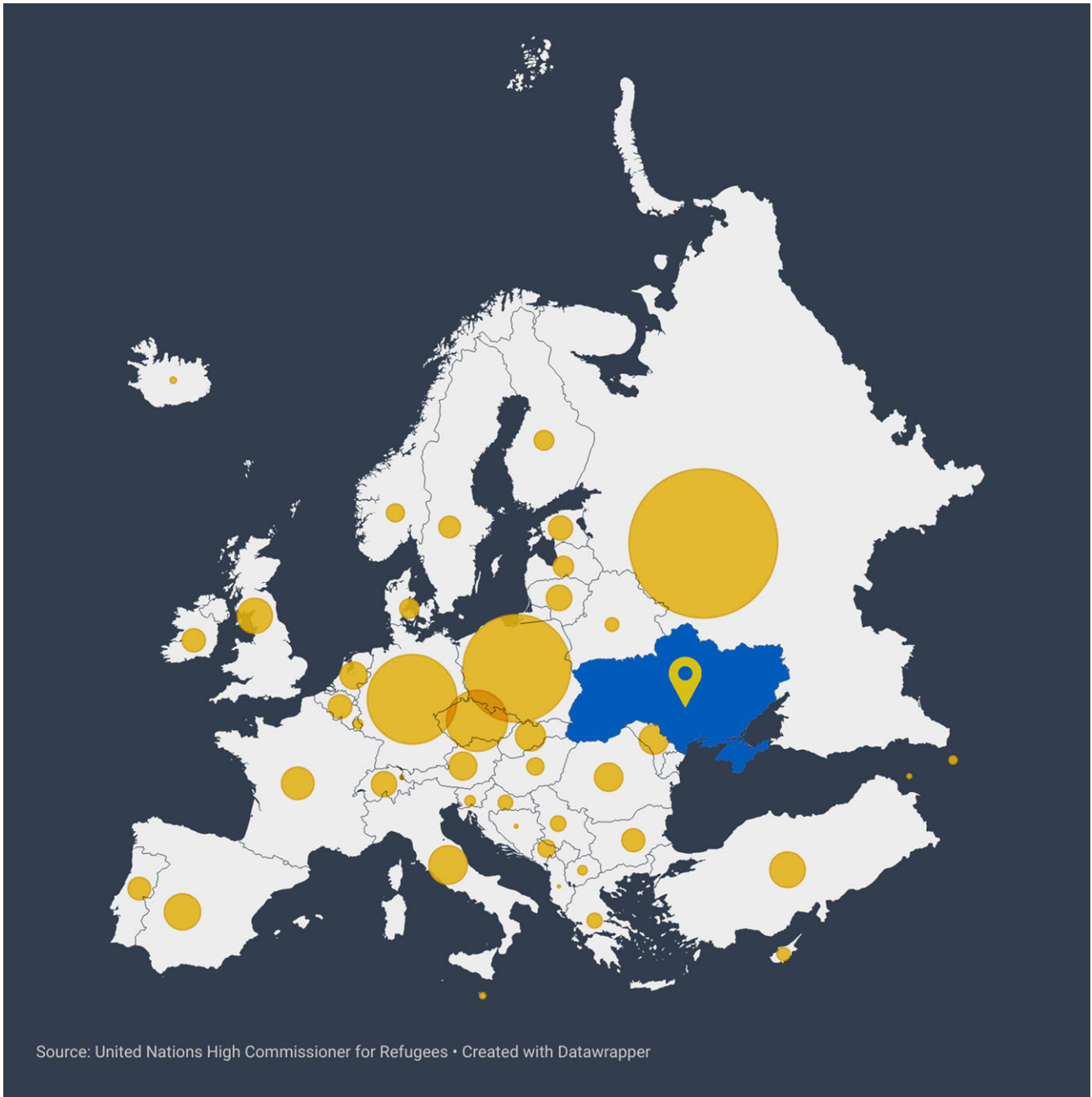


Figure 1. Ukraine refugee crisis. Map of Europe and Russia showing where Ukraine refugees are being pushed as a result of the Russia-Ukraine war refugee crisis. Circle size relative to number of refugees. Ukraine is shown with a location pin. Map generated and printed with permission from Datawrapper. Digital version is available at https://www.datawrapper.de/_/OquD8/.

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