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What's Concerning About the Delta Variant?

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First identified in India, the COVID-19 "Delta" variant (B.1.617.2) is making headlines because it is more transmissible, potentially causes more severe illness, and is not neutralized as easily by antibodies (whether they are from previous infection, vaccination, or are being given as medical treatment).

The first cases of COVID-19 caused by the Delta variant in the U.S. were identified in March, 2021. In June it constituted 10% of all COVID-19 cases in the country. By the beginning of July, according to the CDC, 51.7% of cases were linked to the Delta variant making it the dominant variant in the U.S. Fortunately at this time in South Carolina the Delta variant constitutes less than 1% of the small proportion of COVID-19 cases being genetically sequenced.[1] At MUSC our genetic testing demonstrated that about 78.4% of cases tested in June were due to the Alpha variant and about 3.6% due to the Delta variant. However, as we have seen during this pandemic, what happens in other parts of the globe and the nation often serves as a good warning of the challenges we may face in the future and the interventions we can do to avoid unnecessary illness. Given the trends seen across the U.S. once the Delta variant is present at significant levels it will likely spread quickly in our state unless as a population we take precautions to prevent it from doing so.

So why is the Delta variant considered a "variant of concern?" It has been found to be 40-60% more transmissible than the so called "UK" variant (B.1.1.7)[2] or "Alpha" strain which in turn was 50% more transmissible than the original strain of SARS-CoV-2.[3] In a study of 3,765 total index cases in the UK researchers compared the transmission from an infected individual to other household members and found those with the Delta variant were 1.6 times more likely to infect another household member than those infected with other strains.[4]

Beyond the increased transmissibility which means it can spread to more people with much more ease, research out of Scotland showed that those infected with the Delta variant were almost two times more likely to be hospitalized (however vaccination greatly reduced that risk).[5] The same study also showed that the Delta variant was proportionally higher in younger age groups especially children. There are many variables that could be contributing to this, including behavioral factors (young people spending more time in close proximity) and the fact that there are much higher vaccination rates in the older population.

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[1] https://scdhec.gov/covid19/mis-c-covid-19-variants

[2] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/993321/S1267_SPI-M-O_Consensus_Statement.pdf

[3] https://www.yalemedicine.org/news/5-things-to-know-delta-variant-covid

[4] Allen H, Vusirikala A, Flannagan J, et al. Increased household transmission of COVID-19 cases associated with SARS-CoV-2 Variant of Concern B.1.617.2: a national case-control study. Public Health England. 2021external icon

[5] Sheikh, Aziz et al. "SARS-CoV-2 Delta VOC in Scotland: Demographics, Risk of Hospital Admission, and Vaccine Effectiveness." *The Lancet (British edition)* 397.10293 (2021): 2461–2462. Web.

There is also evidence that there is a reduction in the neutralizing effect of antibodies from other strains of SARS-CoV-2. This is important for a few reasons. First it means that the monoclonal antibody treatments that are used to decrease the severity of illness and the need for hospitalization in some patients are not as effective. [6,7] Secondly a study in Cell demonstrated that there is a decreased neutralizing effect of antibodies from "convalescent serum" from individuals previously infected with other SARS-CoV-2 strains.[5] The researchers took plasma from individuals infected during the first wave of infection in the UK before June 2020 and then tested how well the antibodies in that serum neutralized virus with the Delta variant mutations. They found significant decreases in the ability of those antibodies to fight off the virus leading the authors to conclude that individuals previously infected by these variants may be more susceptible to reinfection with the Delta variant. While the neutralizing effect was diminished in this study it was still present. More research is needed to understand to what degree natural immunity is protective against the Delta variant.

The good news is that, so far, preliminary data have shown that the Pfizer-BioNTech, AstraZeneca, and Moderna vaccines are all protective against the Delta variant. Public Health England provided a report showing that the Pfizer-BioNTech vaccine was 88% effective against symptomatic disease from the Delta variant 2 weeks after the second dose, compared to 93% effectiveness against the Alpha variant, but still had excellent efficacy at preventing hospitalization though at 96%.[8] In the study out of Scotland vaccine effectiveness dropped from 92% for other variants to 79% for the delta variant at protecting from infection.[5]

Public Health England also reported that the AstraZeneca vaccine was 60% effective against symptomatic disease from the Delta variant compared to 66% effectiveness against the alpha variant again demonstrating a slight decrease in efficacy.[7] Meanwhile, non-peer reviewed reports from the vaccine companies Johnson and Johnson and Moderna report the vaccines are still effective with only small decreases in neutralizing effect of the vaccine. So while the neutralizing effect of antibodies from vaccines does seem to be somewhat reduced, thusfar it seems the vaccines still offer a high level of protection, especially from more severe illness.

Currently South Carolina has low to moderate COVID-19 transmission throughout the state and is not experiencing a large burden of disease as a result of the Delta variant. However at this time, only 43% of all eligible residents have been vaccinated in South Carolina.[9] Our best bet to prevent the Delta variant from spreading across our state is for those without immunity from vaccination or recent infection to remain vigilant, practice social distancing, avoid indoor gatherings, wear masks and practice good hand hygiene or just get vaccinated.

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[6] Planas, D., Veyer, D., Baidaliuk, A. *et al.* Reduced sensitivity of SARS-CoV-2 variant Delta to antibody neutralization. *Nature* (2021). https://doi.org/10.1038/s41586-021-03777-9

[7] Liu, Chang et al. "Reduced Neutralization of SARS-CoV-2 B.1.617 by Vaccine and Convalescent Serum." *Cell* (2021): n. pag. Web.

[8] https://khub.net/web/phe-national/public-library/-/document_library/v2WsRK3ZlEig/view_file/479607329?_com_liferay_document_library_web_portlet_DLPortlet_INSTANCE_v2WsRK3ZlEig_redirect=https%3A%2F%2Fkhub.net%3A443%2Fweb%2Fphe-national%2Fpublic-library%2F-%2Fdocument_library%2Fv2WsRK3ZlEig%2Fview%2F479607266

[9] https://scdhec.gov/covid19/covid-19-vaccination-dashboard