3 June 2021 Risk assessment for SARS-CoV-2 variant: Delta (VOC-21APR-02, B.1.617.2) Public Health England

Indicator	RAG*	Confidence	Assessment and rationale
Transmissibility between humans		**HIGH**	**Transmissibility appears greater than wild type (first wave) SARS-CoV-2** Delta continues to demonstrate a substantially increased growth rate compared to Alpha, across multiple analyses. Delta cases are rising whilst Alpha cases are declining. Secondary attack rates, including household secondary attack rates, are higher for Delta, but these are not yet corrected for vaccination status. There is in vitro evidence suggestive of increased replication in biological systems that model human airway. It is highly likely that Delta is significantly more transmissible than Alpha.
Infection severity		**LOW**	**Increased severity (hospitalisation risk) when compared to Alpha** Early evidence from England and Scotland suggests there may be an increased risk of hospitalisation compared to contemporaneous Alpha cases. A large number of cases are still within the follow up period. In some areas, hospital admissions show early signs of increasing, but the national trend is not clear.
Immunity after natural infection		**LOW**	**Experimental evidence of functional evasion of natural immunity but insufficient epidemiological data** Pseudovirus and live virus neutralisation using convalescent sera from first wave and Alpha infections shows a reduction in neutralisation. National reinfection surveillance data are being analysed. There is no increase in numbers of reinfections in the SIREN national healthcare worker cohort.
Vaccines		**HIGH**	**Epidemiological and laboratory evidence of reduced vaccine effectiveness** There are now analyses from England and Scotland supporting a reduction in vaccine effectiveness for Delta compared to Alpha. This is more pronounced after one dose (absolute reduction in vaccine effectiveness against symptomatic infection of approximately 15-20% after 1 dose). Iterated analysis continues to show vaccine effectiveness against Delta is higher after 2 doses but that there is a reduction for Delta compared to Alpha. There is a high level of uncertainty around the magnitude of the change in vaccine effectiveness after 2 doses of Oxford-AstraZeneca vaccine. Although this is observational data subject to some biases, it holds true across several analytic approaches and the same effect is seen in both English and Scottish data. It is strongly supported by pseudovirus and live virus neutralisation data from multiple laboratories. There are no data on whether prevention of transmission is affected and insufficient data to assess vaccine effectiveness against severe disease. The acquisition of an additional mutation which may be antigenically significant in a small number of cases is noted.
Overall assessment			Delta is predominant and all analyses find that it has a very substantial growth advantage. The observed high growth rate is most likely to be due to a combination of place based context, transmissibility and immune escape. Both English and Scottish analyses continue to support the finding of reduced vaccine effectiveness which has increased to high confidence. New early data from England and Scotland suggest a possible increased risk of hospitalisation compared to Alpha. The priority investigations are vaccine effectiveness against hospitalisation and transmission, household secondary attack rate corrected for vaccination, characterisation of the generation time, viral load and period of infectivity, and epidemiological studies of reinfections.

The therapeutics risk assessment is under review for all variants and is not included.

*refer to scale and confidence grading slide