Update on Delta and other Variants in South Africa

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for the Network for Genomic Surveillance South Africa (NGS-SA)
South Africa has entered exponential growth phase (Re >1)
Detection of Delta in South Africa

Variants
- Other lineages
- 20H (Beta, V2)
- 20I (Alpha, V1)
- 21A (Delta)
- 21B (Kappa)
- 21D (Eta)
- B.1.1.318
- NA
Variants over time by province

South Africa variants by province

KwaZulu-Natal
Gauteng
Western Cape
Northern Cape
North West
Free State
Mpumalanga
Limpopo
Eastern Cape

Variants
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- Other lineages
Detection of Delta in KZN from community surveillance

Across six districts and in > 30 random selected sites of KwaZulu-Natal, Harry Gwala (n=16), Zululand (n=15), iLembe (n=14), eTheweni (n=12), King Cetshwayo (n=1) and Ugu (n=1)
Delta also detected and increasing prevalence in the Western Cape

Delta was detected in 3/3 samples in the Garden route in late May
Very limited data in Gauteng

NICD responsibility, but KRISP has now received samples this Thursday (2 days ago) and will have results by Monday/Tuesday.
Delta mutation profile – spike protein

- Two mutations in receptor-binding domain: \(L452R\) & \(T478K\)
- Substitution: \(T19R\)
- Deletion: \(157-158del\)
- Mutation adjacent to S1/S2 furin cleavage site: \(P681R\)

https://covdb.stanford.edu/page/mutation-viewer/#sec_delta
Onset of Illness among the First 425 Confirmed Cases of Novel Coronavirus (2019-nCoV) – Infected Pneumonia (NCIP) in Wuhan, China.

Delta global distribution

First sampled in India October 2020
Now detected in 85 countries, including several in Africa, and rapidly becoming dominant in many countries

https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports
Summary of Delta variant

Transmissibility
Highly transmissible – more than all other variants, including Beta

Disease severity
No clear evidence yet

Risk of reinfection
Reduction in neutralization with serum from people infected with Beta variant

Vaccines
No evidence of vaccine escape
High levels of protection against severe disease
Evidence of increased transmissibility

- Preliminary estimates from genomic data and epidemiological studies suggest Delta may be significantly more transmissible than other variants of concern, including Beta (30-60% more transmissible)

- These data imply that Delta could be approximately twice as transmissible as the earlier non-VOC/VOI viruses

Campbell F, et al. Eurosurveillance 2021
Public Health England Technical Briefings
Clinical presentation

• Some evidence from UK that symptom profile could be different – most prominent current symptoms are headache, sore throat, runny nose and sneezing

• More work needed to confirm if this is a consistent finding with the Delta variant or reflects clinical profile of infections in certain age groups and/or in partially/fully vaccinated individuals

Disease severity

- Early evidence from the UK suggests there may be an increased risk of hospitalisation within 14 days of a positive test, compared to contemporaneous cases with Alpha variant (risk approximately double).

- No evidence currently from the UK of increased case fatality ratio with Delta variant, but more follow-up of cases required.
## Vaccine effectiveness

UK data – symptomatic disease

<table>
<thead>
<tr>
<th>Vaccine</th>
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<th>Vaccine effectiveness two doses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Alpha</td>
<td>Delta</td>
</tr>
<tr>
<td>Astra Zeneca</td>
<td>51% (47-55)</td>
<td>33% (19-44)</td>
</tr>
<tr>
<td>Pfizer</td>
<td>49% (43-55)</td>
<td>33% (8-51)</td>
</tr>
</tbody>
</table>

Compared to Alpha, there was a modest reduction in effectiveness against symptomatic disease after a single dose, but very little difference after two doses.

Lopez Bernal J, et al. medRxiv 2021
## Vaccine effectiveness

**UK data – hospitalisation**

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<td><strong>Astra Zeneca</strong></td>
<td>76% (61-85)</td>
<td>71% (51-83)</td>
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<tr>
<td><strong>Pfizer</strong></td>
<td>83% (62-93)</td>
<td>94% (46-99)</td>
</tr>
</tbody>
</table>

These findings suggest high levels of protection (>70%) against hospitalisation with the Delta variant with one or two doses of either vaccine – levels of protection similar to the Alpha variant.

Stowe J, et al. PHE preprint 2021
Summary

• Delta is now rapidly becoming the dominant SARS-CoV-2 variant in many countries around the world, including SA
• There is now good evidence that Delta is more transmissible than previously circulating viruses and other variants of concern/interest
• There is some reduction in neutralization with convalescent serum collected post-Beta infection, raising concerns about potential for re-infection in SA
• Vaccine effectiveness data from UK suggest good protection against symptomatic disease, and very high levels of protection against hospitalization, after two doses of Pfizer or Astra Zeneca vaccine and seems effective against J&J
Summary of Delta variant

**Transmissibility**
Highly transmissible – more than all other variants, including Beta

**Disease severity**
No clear evidence yet

**Risk of reinfection**
Reduction in neutralization with serum from people infected with Beta variant

**Vaccines**
No evidence of vaccine escape
High levels of protection against severe disease
Network for Genomic Surveillance in South Africa (NGS-SA)

Supported by the DSI and the SA MRC
Impact on antibody neutralization & risk of reinfection

Non-VOC/VOI sera

- Reduced neutralization of Delta by convalescent serum from people infected early in epidemic, but not as marked as the reduction observed with Beta

Beta sera

- However, significant reduction in neutralization of Delta by convalescent serum from people infected with Beta variant

- Raises concern that people with prior Beta infection could be susceptible to reinfection with Delta

Impact on neutralization by vaccines

- Reduced neutralization of Delta by serum from people post-Pfizer and Astra Zeneca vaccine, compared to early circulating strain

- However, reduction in neutralization of Delta less pronounced than for Beta (for both vaccines)

- No neutralization data yet for Johnson & Johnson vaccine