Appendix A - Current variants of concern

What is a variant of concern?

SARS-CoV-2 evolves over time (a characteristic of all viruses), often with minimal impact on the properties of the virus. Some mutations, however, affect viral properties in a way that pose an increased risk to public health. For SARS-CoV-2, the Technical Advisory Group on SARS-CoV-2 Virus Evolution (TAG-VE) monitors for such variants to determine if they meet the definition of a Variant of Interest (VOI) or a Variant of Concern (VOC) (see Appendix C – Glossary of Terms).

The TAG-VE identified five VOCs during the first two years of the pandemic, labelled under the WHO's simplified naming scheme as Alpha, Beta, Gamma, Delta, and Omicron.

Additional resources on variants of concern

Current variants of concern – Australian context

- *Communicable Diseases Genomics Network - variants of concern*
- *NSW Government Agency for Clinical Innovation – Living Evidence – SARS-CoV-2 variants*

Current variants of concern – Global context

- *WHO – Tracking SARS-CoV-2 variants*

What are the current variants of concern?

- B.1.617.2 (Delta) and sub-lineages AY
- B.1.1.529 (Omicron) and sub-lineages BA

What are the key characteristics of the current variants of concern in Australia?

Evidence is constantly evolving for current and emerging variants of concern (VOCs). The table below aims to summarise the key characteristics of current VOCs based on the best available evidence at time of publication, including:

- Basic reproduction number
- Incubation period
- Infectious period
- Clinical presentation, outcome and vaccine effectiveness
- Reinfection risk
- Household secondary attack rates

Other relevant characteristics will be presented if likely to have a detrimental impact on Australia's public health requiring review of the guidelines. Examples of such characteristics include resistance to therapeutics or decreased specificity and sensitivity of available diagnostics.

Table 1 Key characteristics of current variants of concern

Characteristic	B.1.617.2 (Delta) and sub-lineages AY	B.1.1.529 (Omicron) and sub-lineages BA
Basic Reproduction number *Ancestral strain estimated average: 3.28 (1)*	Estimated average: 5.08 (range 3.2 to 8) (1)	Estimated average: 9.5 (range 5.5 to 24) (2).
Incubation period *Ancestral strain estimated 5-6 days (range 1 to 14) (3, 4)*	Estimated average: 5.8 days 95th percentile was 11.3 days (5)	BA.1 sub-lineage estimated average: approximately 3 days (range 0 – 8 days) (6-10)
Infectious period *Ancestral strain (mild-moderate infections) ~ 48 hours prior to symptom onset to 10 days post symptom onset (11)*	Infectiousness peak ~ 1.3 days before symptom onset (5). Median time for viral culture to become negative in non-severe infections was 6 days after symptom onset (range 1 to 16 days) (12)	Preliminary evidence suggestive of pre-symptomatic transmission (8) Median time for viral culture to become negative in non-severe infections was 6 days after symptom onset (range 3-14 days) (12)
Clinical presentation and outcome	Evidence suggests Delta is associated with more severe disease than the Alpha variant (13).	Evidence suggests Omicron is associated with less severe disease than the Alpha and Delta variants (13).
Vaccine effectiveness[1]	2 doses: appear to provide >80% protection against severe disease after 5 months (14). 40-80% effective against symptomatic disease after 5 months (14). Booster dose: evidence suggests > 90% protection against symptomatic disease 2 weeks after booster dose (15).	2 doses: appear to provide >70% protection against severe disease after 6 months (16-18). <25% effective against symptomatic disease after 6 months (16, 17, 19). Booster dose: preliminary evidence suggests > 80% protection against severe disease (16-18). 40-70% protection against symptomatic disease (wanes over time).
Reinfection Risk	Prior SARS-CoV-2 infection provides an estimated 92% protection against reinfection with Delta (20).	Estimates prior infection with non-Omicron variants provide an estimated 60% time-limited protection against reinfection with Omicron (20). Preliminary evidence suggests effectiveness of BA.1 infection against **short-term** reinfection with BA.2 is around 95% (21).
Household secondary attack rate *Ancestral (Australia) ~ 22.5% (22)*	Australian estimates unavailable at time of publication United Kingdom estimates: 10.1% Denmark estimates: 21% (23)	Australian estimates unavailable at time of publication United Kingdom estimates: 13.6% Denmark estimates: 31% (23)

[1]Evidence is emerging. Data ranges are based on Comirnaty (Pfizer – BNT162b2), Vaxzevria (AstraZeneca – ChAdOx1), and Spikevac (Moderna – mRNA-1273) vaccines, where data available. May differ in people at very high-risk of severe disease.

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