Supplementary Appendix 1

The 7-day incidence and mortality rate, test positivity ratio and testing rate, hospital occupancy rate, ICU occupancy rate, ventilator occupancy rate, percentage of population vaccinated, and the ratio of variants to total cases are given in Supplementary table 1.

Supplementary table 1: Epidemiological indicators of transmission

Indicator	Function	Base unit
7-day incidence rate	$\frac{No.of\ reported\ cases\ (in\ time\ period)}{Mid-year\ population}\ x\ 100{,}000$	Per 100,000 population
7-day mortality rate	$\frac{No.of\ reported\ mortalities\ (in\ time\ period)}{Mid-year\ population}\ x\ 100{,}000$	Per 100,000 population
Test positivity ratio	$\frac{14-day\ lagged\ reported\ cases\ (per\ day)}{No.of\ individuals\ tested\ \ (per\ day)}$	Percentage
Testing rate	$\frac{No.of\ individuals\ tested\ \ (per\ day)}{Mid-year\ population}\ x\ 1{,}000$	Per 1,000 population
Hospitalisation bed utilisation rate	$\frac{No.of\ admitted\ patients}{No.of\ hospital\ beds\ available}\ x\ 100$	Percentage
ICU bed utilisation rate	$\frac{No.of\ patients\ admitted\ in\ ICU}{No.of\ ICU\ beds\ available}\ x\ 100$	Percentage
Ventilator utilisation rate	$\frac{No.of\ patients\ utilising\ ventilators}{No.of\ ventilators\ available}\ x\ 100$	Percentage
Percentage population vaccinated	$\frac{No.of\ individuals\ vaccinated\ (1st\ or\ 2nd\ dose\ cumulative\ up\ to\ date)}{Mid-year\ population\ (Adult\ or\ Total)}\ x\ 100$	Percentage
Ratio of variants to cases	$\frac{Cumulative\ no.of\ variants\ detected\ (by\ strain\ in\ time\ period)}{No.of\ reported\ cases\ (in\ time\ period)}$	Ratio

The Cori et al. approach was used to estimate the time-varying (instantaneous) reproduction number (R_t) on 7-day sliding intervals, with 95% credible intervals. This approach used a time-series of daily case data by reporting date and a serial interval distribution assumed to follow a discretised gamma distribution. It then models the number of secondary infections at each time step relative to the number of primary infections and a period of infectiousness represented by the serial interval. The time-varying reproduction number is defined as the fraction of the expected number of secondary infections at time t over the number of infected individuals weighted by their relative infectiousness at time t, given by the generation or serial interval distribution. [44] Serial intervals from a review of published and unpublished literature were assumed to fit the Malaysian profile of cases. [45–51] An R_t of more than 1 suggests that the epidemic will continue to grow, whilst an R_t of less than 1 suggest transmission is in decay. The R_t is given by:

$$R_t = \frac{I_t}{\sum_{s=1}^{t} I_{t-s}\, w_s}$$

Where I_t is the number of infections on day t, and w_s is the generation interval of s days separate an infector-infectee pair.