Methodology Note for Verité Research's Vaccination Scoreboard

This note sets out the assumptions and calculations for the projected numbers provided on Verité's Vaccination Scoreboard.

Assumptions:

- For the years under consideration (2021-2022), the Sri Lankan population is assumed to grow at the same rate of growth during the period 2018-2019 (0.61%).[1]
- The reference population to be vaccinated is assumed to be two-thirds of the total population.[2] This is cited by various sources as reference level for achieving herd immunity in a population. In Sri Lanka, this is also equivalent to the average share of the population that is over 20 years of age during the period 2014-2019.
- As of 6 July 2021, the first and second doses of the Sinopharm vaccine had been administered to 2,865 and 2,435 Chinese nationals in Sri Lanka who are not counted in the population statistics.[3] We assume that the cumulative vaccination numbers reported by the Epidemiological Unit of the Ministry of Health includes these vaccinations. Therefore, they have been added to the reference population to arrive at the target population to be vaccinated.

Calculations based on the above assumptions:

Let T be the total population for Sri Lanka in the year 2022. Then,

$$T_{2022} = (1 + r)^3 \times T_{2019}, \text{ where } r \text{ is the population growth rate.}$$

All the vaccines currently being administered in Sri Lanka require two doses to be fully vaccinated. Therefore, the required number of doses is twice the target population. If V is the number of doses needed to fully vaccinate the target population, it is calculated as:

[1] Department of Census and Statistics. Statistical Abstract 2020 – Chapter 2. Available at: http://www.statistics.gov.lk/abstract2020/CHAP2/2.5

[2] https://www.who.int/emergencies/diseases/novel-coronavirus-2019/media-resources/science-in-5/episode-1; https://theconversation.com/covid-19-may-never-go-away-but-practical-herd-immunity-is-within-reach-162406

[3] https://www.epid.gov.lk/web/images/pdf/corona_vaccination/covid_vaccination_2021-06_20.pdf

$V = 2 \times \left(\frac{2}{3} \times T_{2022}\right) + c$, where c is the total number of Chinese nationals.

Let D_d be the cumulative number of doses (both first and second doses) administered as at date d, where n_d is the number of days, at date d, since the date of the first vaccination (29 January 2021). Then X_d is the vaccination rate on a given date d, and it is calculated as:

$$X_d = \frac{D_d}{n_d}$$

Similarly, the 10-day average vaccination rate is also given by,

$$X_{d_{10-day\ avg}} = \frac{D_d - D_{d-10}}{10}$$

The number of days N_d from date d forward, that will be taken to achieve full vaccination of the target population, based on X_d, can be calculated as:

$$N_d = \frac{V - D_d}{X_{d_{10-day\ avg}}}$$

When a specified future date s is set to achieve full vaccination of the target population, then n_d^s is the number of days from today to date s. Therefore R_d^s the average vaccination rate needed from date d forward to complete vaccination of the target population by the date s, is:

$$R_d^s = \frac{V - D_d}{n_d^s}$$