

One year living with SARS-CoV-2:

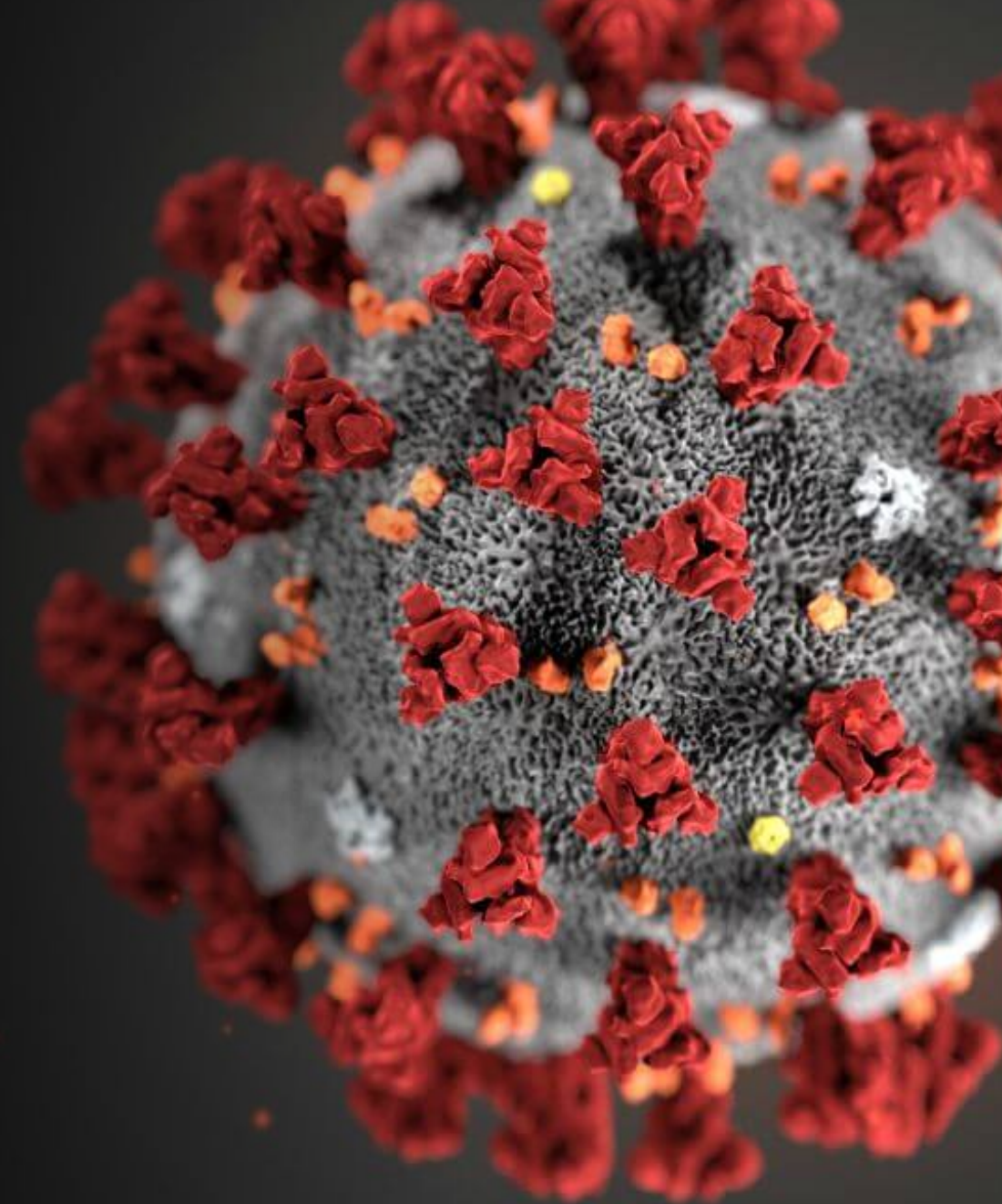
Progress on prevention and treatment, 10 April 2021

Vaccination and Public Health Implication

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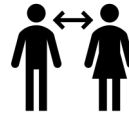
Intervention to control Covid-19 Epidemic

Reduce infection risk



Mask, handwashing, physical distancing & test-tracing-isolation

Reduce exposure between people



Mobility restriction – stay at home

Increase population immunity

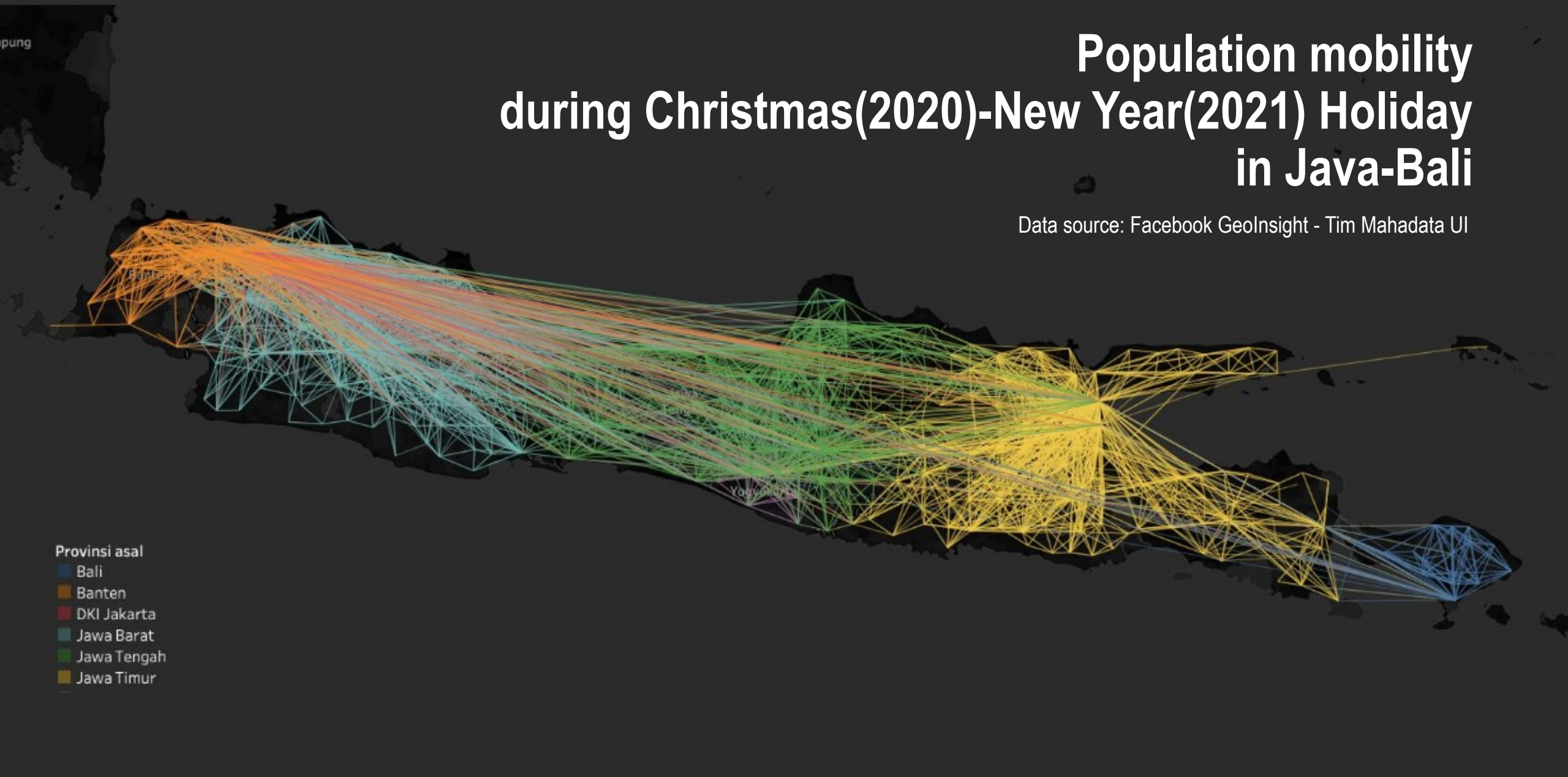


Vaccination & immunity after infection

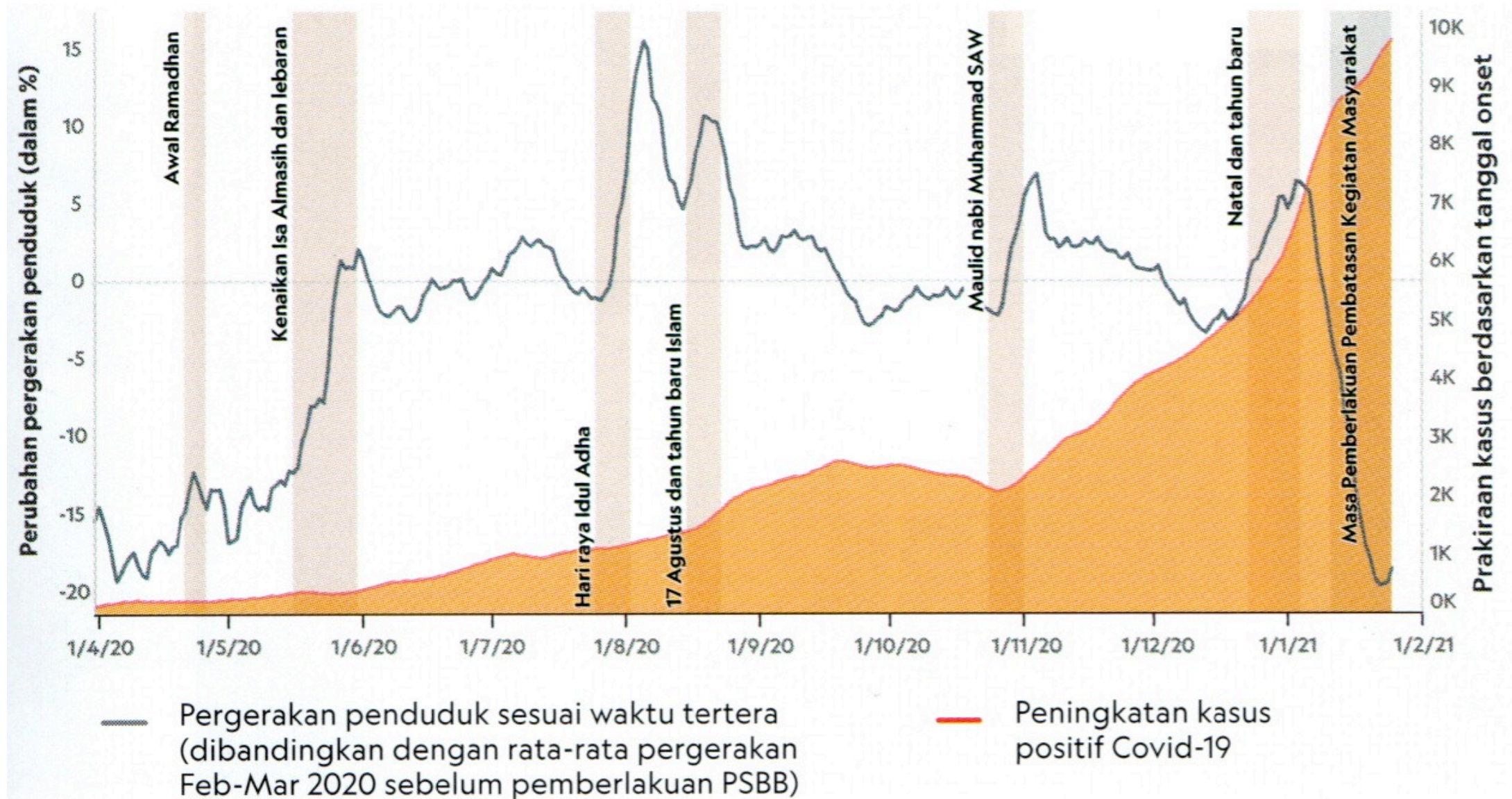
Population mobility during Christmas(2020)-New Year(2021) Holiday in Java-Bali

Data source: Facebook GeoInsight - Tim Mahadata UI

- Provinsi asal
- Bali
 - Banten
 - DKI Jakarta
 - Jawa Barat
 - Jawa Tengah
 - Jawa Timur



Holiday, population mobility and Covid-19 cases in Java-Bali



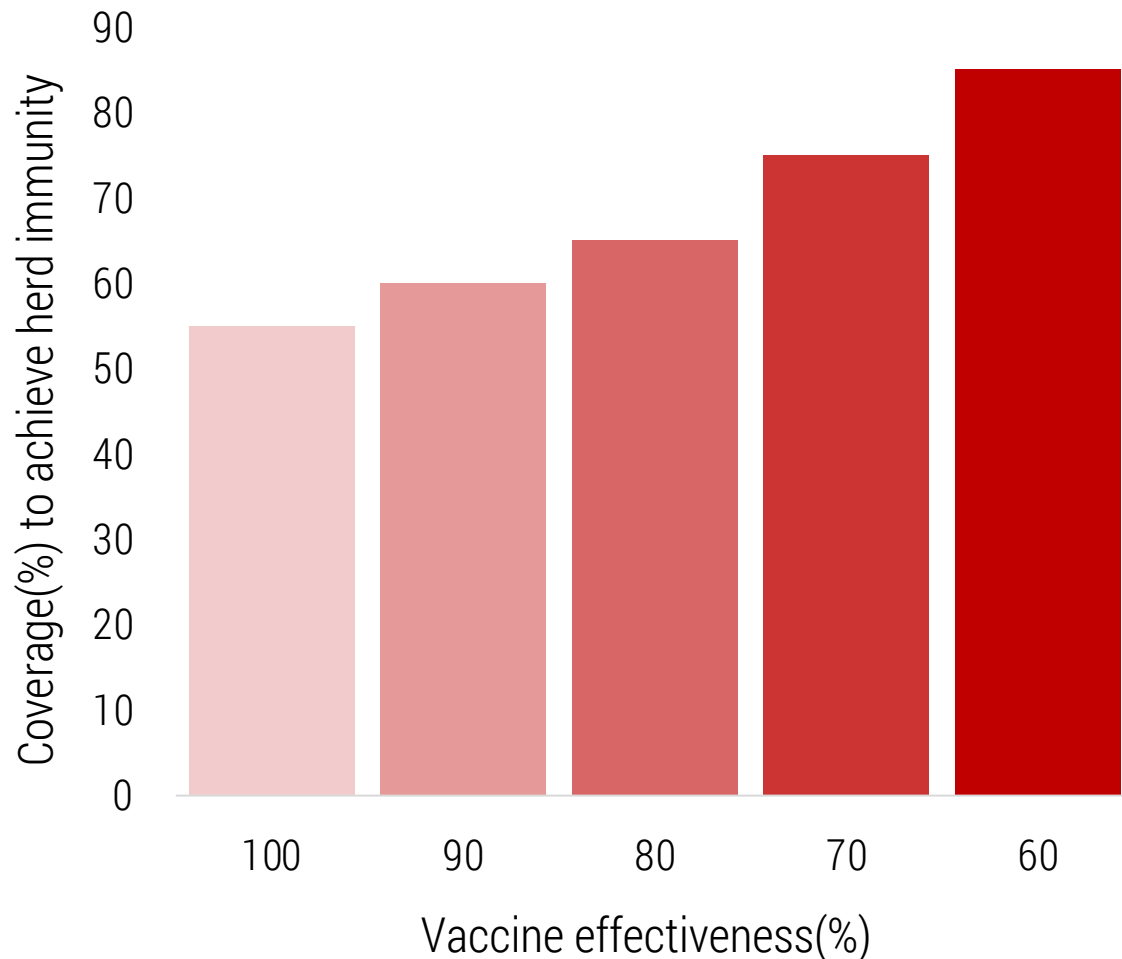
Vaccination to control Covid-19 epidemic

- Effective reproductive number (R) is the average number of secondary cases per infectious case in a population made up of both susceptible and non-susceptible hosts.
 - At the beginning of an epidemic: R_0 (no intervention yet)
 - At time t of an epidemic: R_t (some intervention)
- R as a measure of an epidemic:
 - $R > 1$, number of cases is increasing (uncontrolled)
 - $R = 1$, number of cases is steady state (endemic)
 - $R < 1$, number of cases is decreasing (controlled)

Vaccination to control Covid-19 epidemic

- Effective reproductive number, vaccine effectiveness and vaccination coverage:
 - $R_t = R_0(1 - (\text{vacc. effectiveness} * \text{coverage}))$
- Herd immunity occurs when a large portion of a community (the herd) becomes immune to a disease, making the spread of disease from person to person unlikely. As a result, the whole community becomes protected — not just those who are immune.
 - $R_t < 1.0$ (e.g 0.9)
 - $R_0 = R$ at the beginning of epidemic without any intervention
 - Life becomes “normal” as before epidemic

Covid-19 vaccination to achieve herd immunity



- Sinovac efficacy is 65%, it needs 85% coverage to achieve herd immunity
 - Will take time to achieve this coverage.
- Vaccine **IS NOT a magic bullet.**
- Vaccination is a long-term solution and should be implemented together with non pharmaceutical intervention and test-tracing-isolation.
- Epidemic can be controlled before herd immunity was achieved with vaccination + non pharmaceutical intervention and test-tracing-isolation.

Indonesia journey to Herd Immunity



Epidemic is controlled

Vaccine coverage $\geq 40\%$



Current situation

Adherence to health protocol: medium

Test-tracing-isolation: low

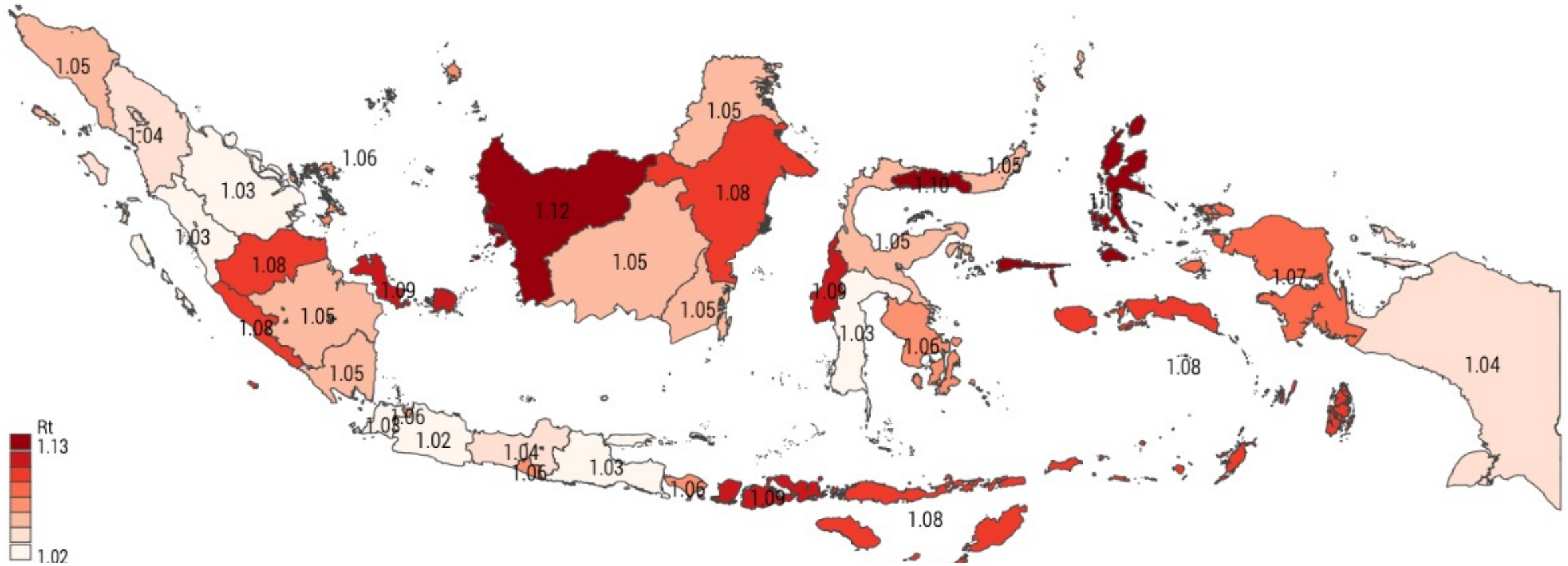


Herd
immunity

Vaccine coverage $\geq 85\%$

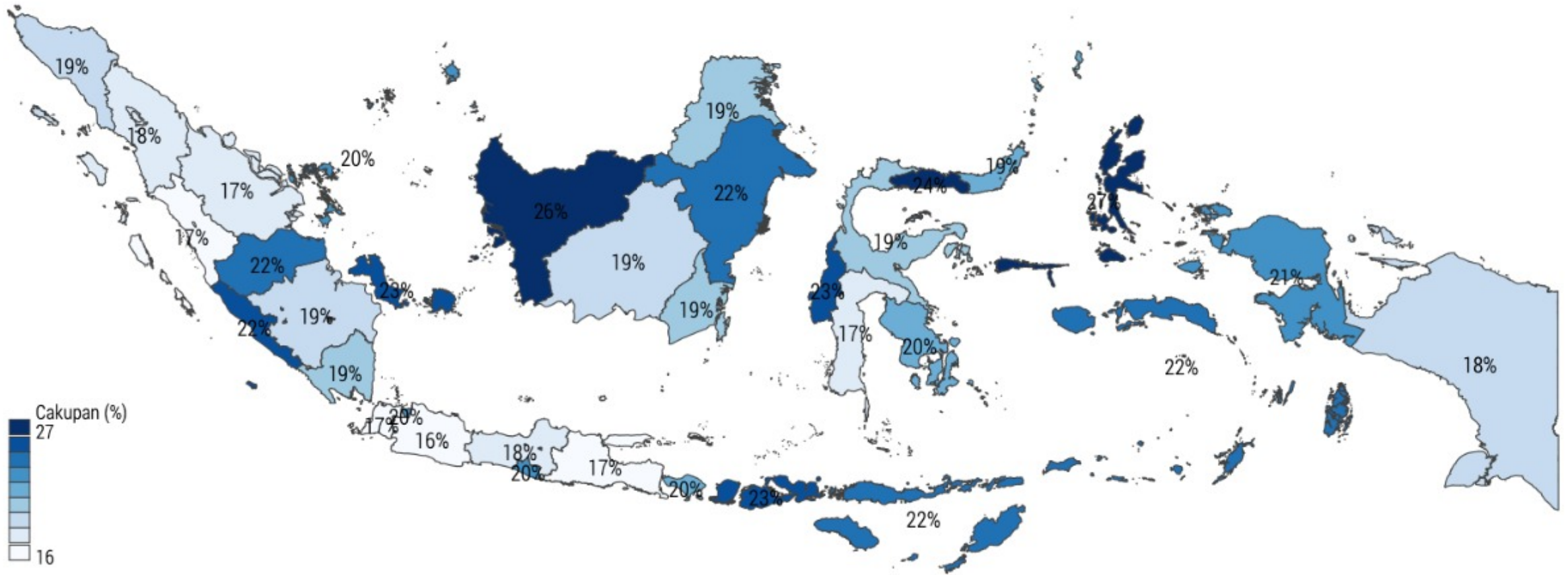
Note: * estimated using assumption of target $R_t=0.9$, vaccine effectiveness 65%.

Covid-19 effective reproductive number by province, February 2021



Source: Iwan Ariawan, Pandu Riono, Muhamad N Farid, Hafizah Jusril, Tiopan Sipahutar, Wiji Wahyuningsih. *Kapankah Indonesia luput dari Pagebluk*. National Geographic Indonesia, April 2021

Minimum Covid-19 vaccination coverage to reach effective reproductive number of 0.9 by province



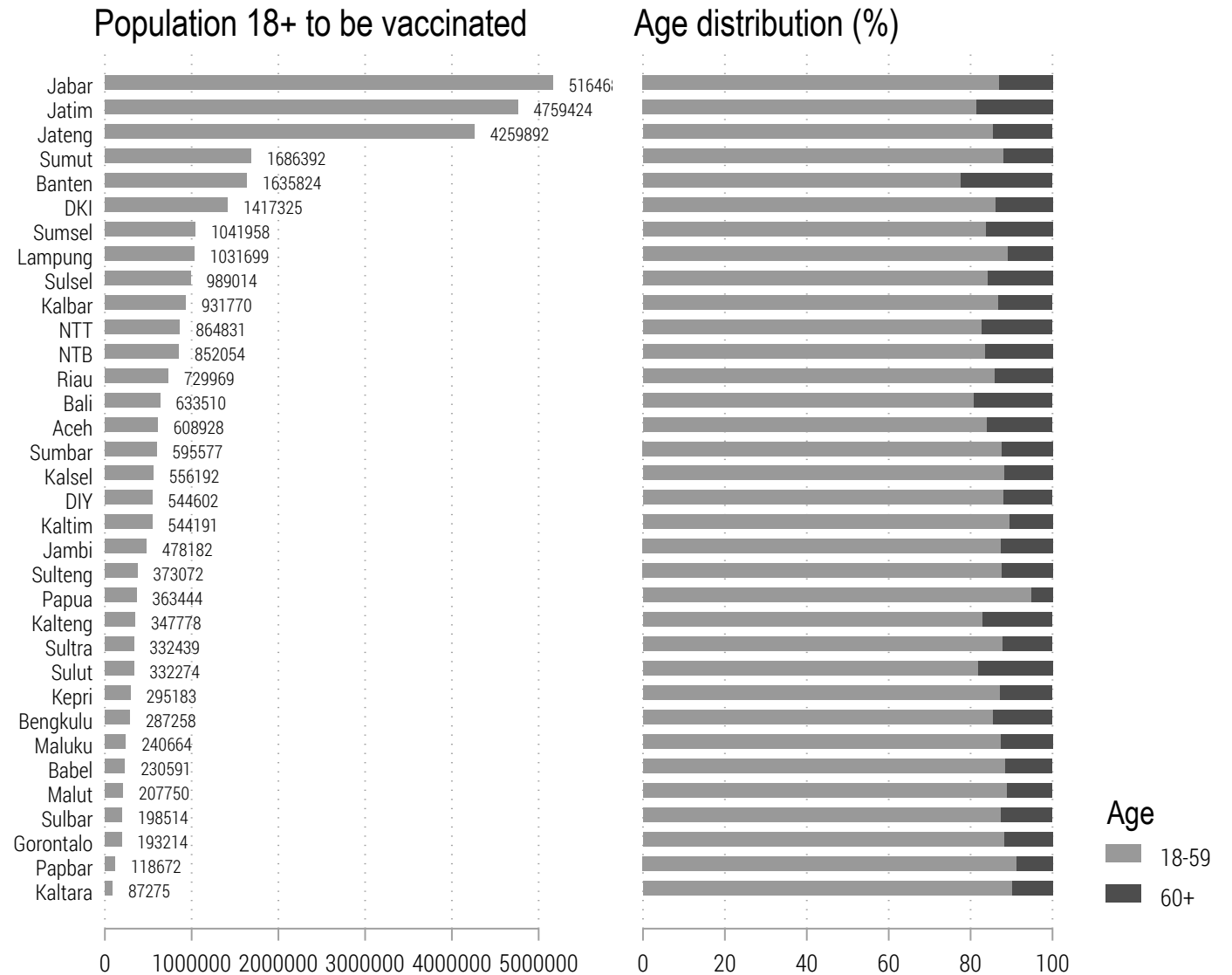
Note: calculation based on effective reproductive number in February 2021

Source: Iwan Ariawan, Pandu Riono, Muhamad N Farid, Hafizah Jusril, Tiopan Sipahutar, Wiji Wahyuningsih. Kapankah Indonesia luput dari Pagebluk.

National Geographic Indonesia, April 2021

Minimum number of population to be vaccinated to reach effective reproductive number of 0.9

Note: calculation based on effective reproductive number in February 2021

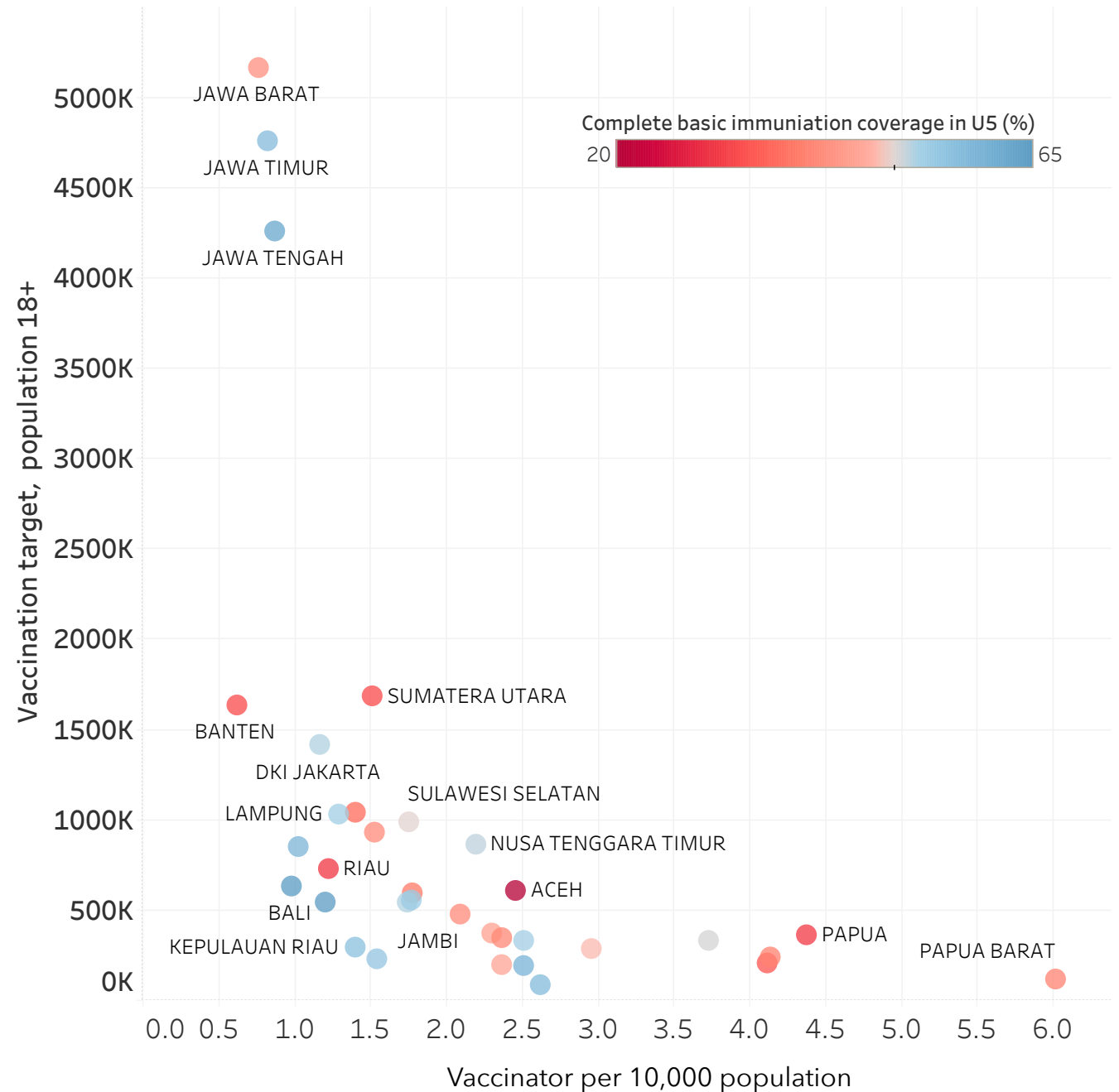


Source: Iwan Ariawan, Pandu Riono, Muhamad N Farid, Hafizah Jusril, Tiopan Sipahutar, Wiji Wahyuningsih. Kapankah Indonesia luput dari Pagebluk. National Geographic Indonesia, April 2021

Balancing between Covid-19 vaccination and basic immunization program

Note:

- Vaccination target is estimated from R_t in February 2021 to achieve $R_t=0.9$ with vaccine effectiveness of 70%
- Number of vaccinator is from MOH data
- Population data from Indonesia Statistics (BPS)
- Basic immunization coverage from Susenas 2019



Thank You