State of the pandemic 16th April 2020

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An emerging role for immunity





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Novel variants





An emerging role for immunity

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Vaccines





ACE2 expression falls











the symptoms



<u>New phenotypes from new variants</u>

- -increased avidity for ACE2
- -increased transmissibility
- -increased capacity to overcome natural or vaccinal immunity -increased virulence



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Why the sudden surge in variants at the end of 2020?



the symptoms



Authorised and recommended in the USA: Pfizer-BioNTech Moderna Johnson & Johnson / Janssen

Others: Astra-Zeneca Cansino Sinovac Sinopharm Novavax

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Data from Israel

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Rossman et al. Medarxiv



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Earle et al. Medarkiv

Getting Vaccines

"Africa will need about **1.5 billion doses of vaccine**. (Its population is 1.2 billion, and most vaccine candidates require two doses.) The cost of the vaccine and of building systems and structures required for delivery is estimated at between \$7 billion and \$10 billion, according to Africa CDC. For comparison, the 2020 US PEPFAR budget was \$6.9 billion."

John N. Nkengasong (director of Africa CDC), Nicaise Ndembi (senior science adviser at Africa CDC), Akhona Tshangela (programme manager for mortality surveillance at Africa CDC), Tajudeen Raji (head of the division of public-health institutes and research at Africa CDC).



A volunteer nurse assesses a visitor to a health centre in Nairobi that trains the public on infection preventio

https://www.nature.com/articles/d41586-020-02774-8



Gavi is co-leading COVAX, the vaccines pillar of the Access to COVID-19 Tools (ACT) Accelerator. This involves coordinating the COVAX Facility, a global risk-sharing mechanism for pooled procurement and equitable distribution of COVID-19 vaccines.

https://www.gavi.org/covax-vaccine-roll-out

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Last week, Johnson & Johnson pledged 400 million doses to the AU

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Immune escape variants

- Vaccination that results in intermediate immunity might favour selection for immune escape variants
- There seems to be reasonable amounts of cross-protection among variants, i.e., immunity developed to escape variants seems likely to protect against other strains.
- The characteristics of **secondary infections**, or infection after vaccination are still very poorly known but are likely to **govern the years to come.**

Limits of surveillance



Rice et al. 2021. Nature Medicine

Reporting of cases, and even of deaths may be extremely low, yielding a very incomplete picture of the state of the pandemic in much of the world.







Hesitancy, equity, waning and evolution



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How long does immunity last? What is the nature of secondary infections?



References

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Thank you

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https://eebcovid19.princeton.edu/

