Introduction
17:00- 17.10
Prof. Dr. Carmen Faso, MCID Co-Chair
Prof. Dr. med. Nicola Low (Moderator)

Speaker presentation
17:15- Dr. Emma Hodcroft, Institute of Social and Preventive Medicine, UniBern
“How is Omicron and how do we identify it?”

17:30- Prof. Dr. Volker Thiel, Institute for Virology and Immunology, Vetsuisse, UniBern
“How is Omicron different from other variants?”

17:45- PD Dr. Christian Althaus, Institute of Social and Preventive Medicine, UniBern
“How well does Omicron spread compared to other variants?”

18:00- Prof. Dr. med. Annelies Wilder-Smith, Institute of Social and Preventive Medicine, UniBern
“What does Omicron mean for international travel?”

18:15- Prof. Dr. Joseph Francois, World Trade Institute, UniBern
“Why and how does Omicron cause an international economic shock?”

Panel discussion
Including the speakers above, together with:

Prof. Dr. Dr. Claus Beisbart
Institute of Philosophy, UniBern

PD Dr. med. Manuela Funke-Chambour
Department for Biomedical Research, Inselspital
How well does Omicron spread compared to other variants?

Multidisciplinary Center for Infectious Diseases (MCID) Event: The SARS-CoV-2 variant Omicron: a snapshot of where we are 8 December 2021

Christian L. Althaus, Ph.D.

Institute of Social and Preventive Medicine
University of Bern
Mittelstrasse 43
3012 Bern

*Image: Nextstrain*
Growth of Omicron in South Africa

Increase in confirmed cases and effective reproduction number
(Source: epiforecasts.io)

Rapid replacement of Delta by Omicron
(Source: Tulio de Oliveira)
Omicron vs. Delta in Gauteng, South Africa

- GISAID: 569 sequences from Gauteng, South Africa (1 Sep - 22 Nov 2021)

- Estimated growth advantage: $\rho = 0.32$ (95% CI: 0.09-0.55) per day

- Caution: Targeted sequencing and stochastic effects (e.g., superspreading) can lead to overestimates of the growth advantage.

- But: Consistent with difference in rate (or $R_e$) of epidemic decline (Delta, Sep-Oct) and growth (Omicron, Nov-Dec)
Increased transmissibility and immune evasion

Immune against infection and transmission with earlier variants

Susceptible to infection and transmission with all variants
Increased transmissibility and immune evasion

 Immune against infection and transmission with earlier variants

 Susceptible to infection and transmission with all variants

 Delta
Increased transmissibility and immune evasion

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- Higher transmissibility of Omicron
- Omicron
- Delta
Increased transmissibility and immune evasion

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**Immune evasion of Omicron**

**Omicron**

**Delta**
### Increased transmissibility and immune evasion

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- **Immune** against infection with earlier variants
- **Susceptible** to infection with all variants

**Higher transmissibility and immune evasion of Omicron**

- Omicron
- Delta
Seroprevalence (and level of protective immunity against infection and subsequent transmission) arguably higher after Delta wave in South Africa. In addition, almost 30% of the population has been vaccinated.

Reference: Kleynhans et al. (2021, Emerg Infect Dis)
Relationship between potential increase in transmissibility and immune evasion for Omicron in Gauteng, South Africa
Relationship between potential increase in transmissibility and immune evasion for Omicron in Gauteng, South Africa

Increase in transmissibility ($\tau$) vs. Immune evasion ($\varepsilon$)

- No immune evasion
- 3 times as transmissible as Delta

Graph showing different lines for various levels of $\Omega$ (10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%) representing increases in transmissibility and immune evasion.
Relationship between potential increase in transmissibility and immune evasion for Omicron in Gauteng, South Africa

![Graph showing the relationship between increase in transmissibility and immune evasion. The graph includes lines for different values of \( \Omega \) (immune evasion) and \( \tau \) (increase in transmissibility). There are annotations indicating medium immune evasion and similar transmissibility as Delta.]
Relationship between potential increase in transmissibility and immune evasion for Omicron in Gauteng, South Africa:

Almost complete immune evasion
Less transmissible than Delta
Considerable uncertainty around the estimates remain.
Further evidence for immune evasion of Omicron: Increased reinfection in South Africa

Figure 5. Empirical estimates of infection and reinfection hazards. A: Estimated time-varying hazard coefficients for primary infection (black) and reinfections (green). Colored bands represent wave periods, defined as the period for which the 7-day moving average of cases was at least 15% of the corresponding wave peak (purple = wave 1, pink = wave 2, orange = wave 3). B: Ratio of the empirical hazard for reinfections to the empirical hazard for primary infections

Reference: Pulliam et al. (2021, medRxiv)
Summary

• Early evidence suggests that the SARS-CoV-2 variant Omicron has a considerable growth advantage compared to Delta in South Africa (~ 0.3 per day).

• Partial evasion of protective immunity against infection and transmission with previous variants can explain the observed dynamics, particularly when population immunity is high.

• An increase - or decrease - of the intrinsic transmissibility of Omicron compared to Delta cannot be excluded, however.

• Close monitoring of the spread of Omicron in countries outside South Africa will be necessary to better understand the potential of this variant to evade naturally acquired and vaccine-elicited immunity.
Thanks

- Emma Hodcroft, Martina Reichmuth
  Institute of Social and Preventive Medicine, University of Bern, Bern, Switzerland

- Houriiyah Tegally, Richard J. Lessells, Tulio de Oliveira
  KwaZulu-Natal Research Innovation and Sequencing Platform (KRISP),
  Department of Laboratory Medicine & Medical Sciences, University of KwaZulu-
  Natal, Durban, South Africa

- Richard Neher
  University of Basel, Basel, Switzerland

- GISAID
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