



Swiss TPH



# The impact of COVID-19 interventions in Switzerland: what can models tell us?

14 April 2021 Virtual Event Series - Session 2

**Dr Andrew Shattock on behalf of the COVID-19 modelling team**

Disease Modelling Unit

Swiss Tropical and Public Health Institute

University of Basel

# This talk

## The impact of COVID-19 interventions in Switzerland: what can models tell us?

- The key questions
  - How can modelling support?
- The OpenCOVID model
- How we model vaccines, NPIs, and testing
- Recent model output and interpretations
- Take away messages

# The key questions

- What level impact can we expect from future interventions?
  - Eg Vaccines, testing, contact tracing, NPIs

Scenario analysis

- What is most likely to hinder our ability to control the epidemic?
  - Eg Viral variants, waning adherence to measures

Sensitivity analysis

- What is the public health-economics trade off?

Health economic analysis

# OpenCOVID

- Individual-based model of SARS-CoV-2 transmission and COVID-19 disease
- Configured to represent COVID-19 epidemic in Switzerland
- Independently funded by **BRCCH** and **SNF**
- Model uses publicly available data
- Model code is open source
- Model methodology publicly available (very soon)
- Simulations are performed on SciCORE, the Uni Basel cluster



# OpenCOVID: the team



**Andrew  
Shattock**



**Epke  
Le Rutte**



**Robert  
Dünner**



**Swapnoleena  
Sen**



**Sherrie  
Kelly**



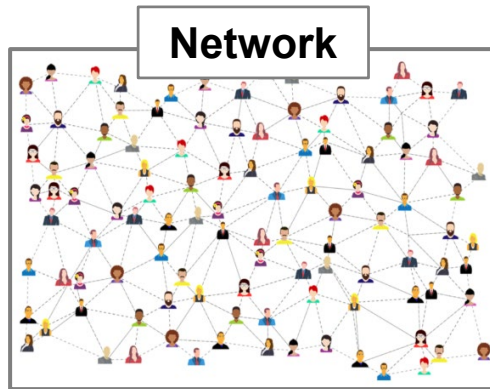
**Nakul  
Chitnis**



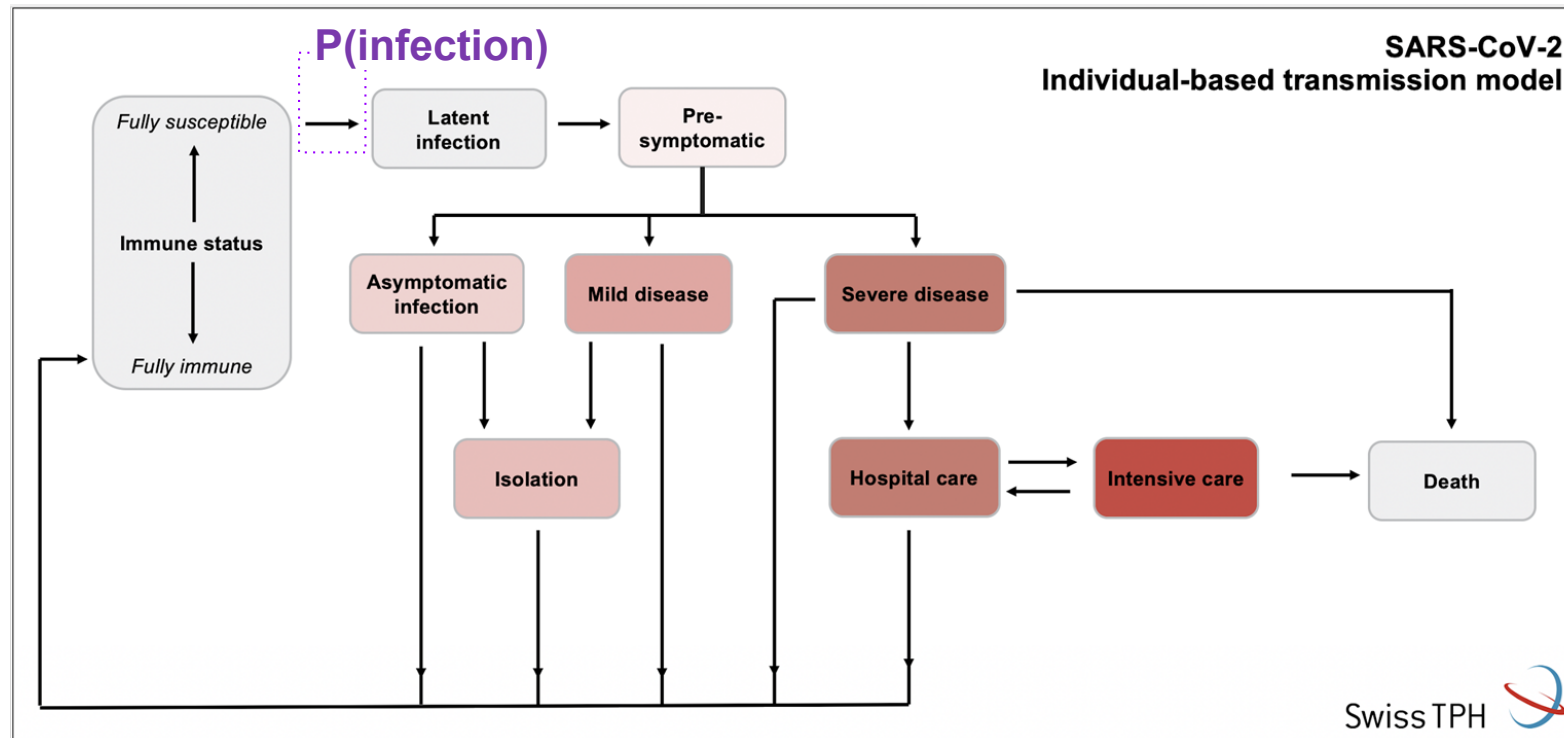
**Melissa  
Penny**



# OpenCOVID



- Swiss demographics
- Age structured, contact data from surveys
- Considers healthcare workers and people with comorbidities

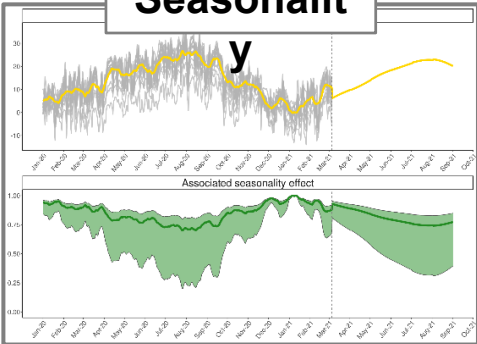


# OpenCOVID

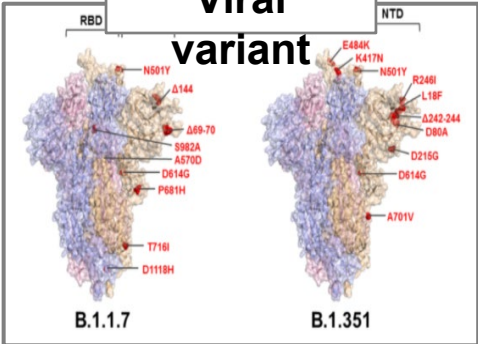
Network



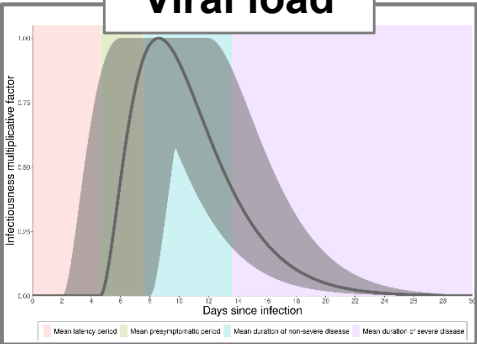
Seasonality



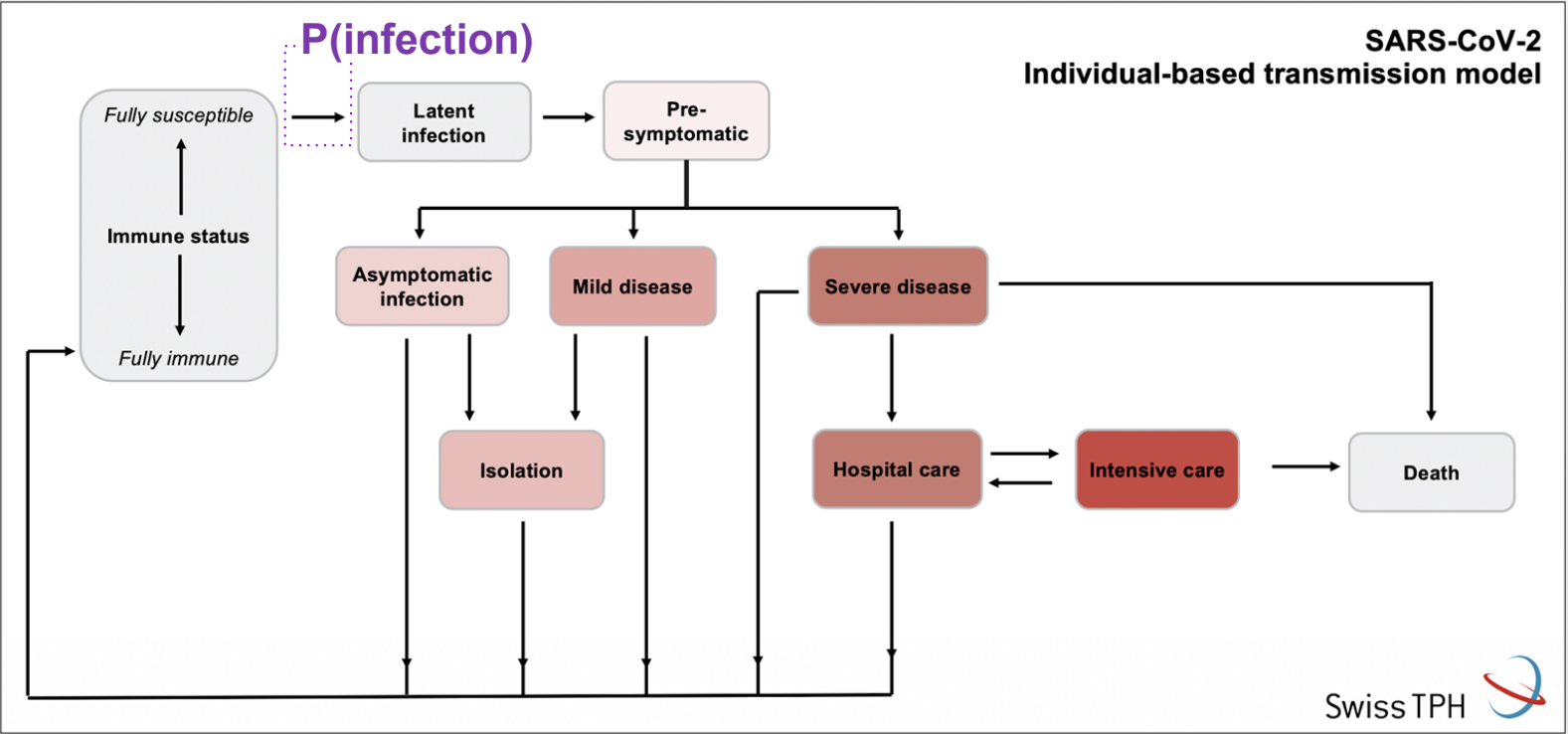
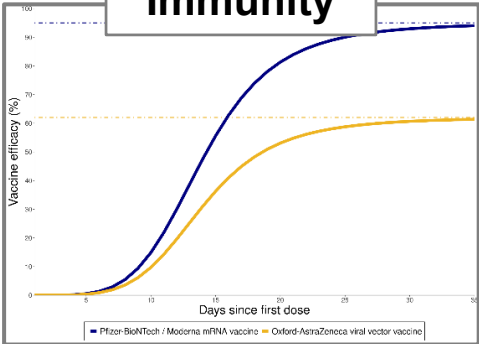
Viral variant



Viral load



Immunity

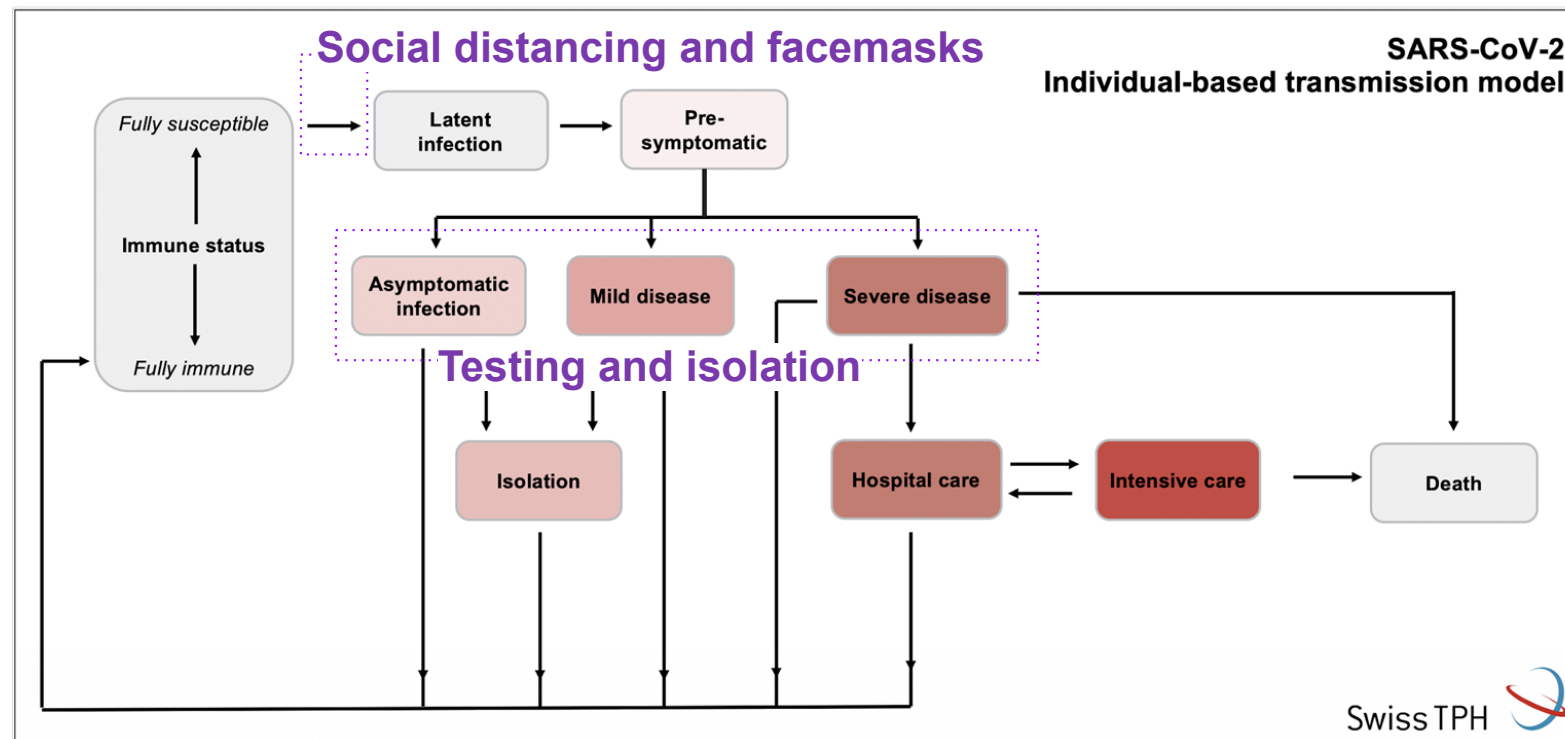
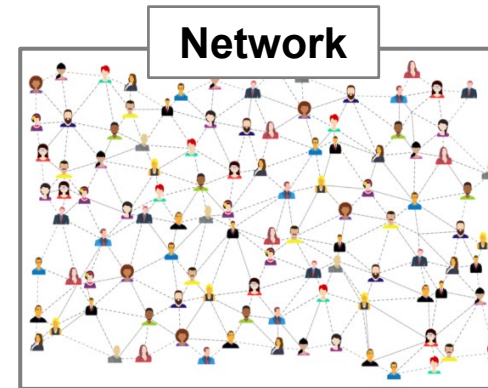




# OpenCOVID: interventions

## Non-pharmaceutical interventions

- All social distancing and facemask policies
- Testing, contact tracing, and subsequent isolation
- **Oxford Containment and Health Index** by **canton**
  - Reduction in effective contacts
  - A systematic, **viable** approach





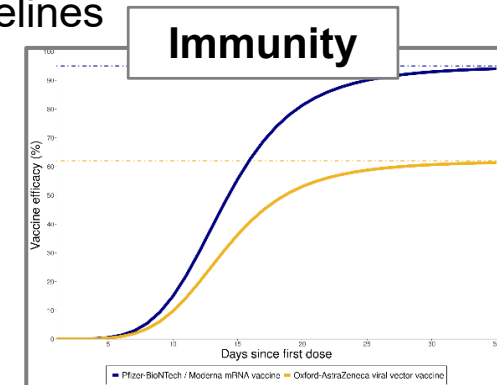
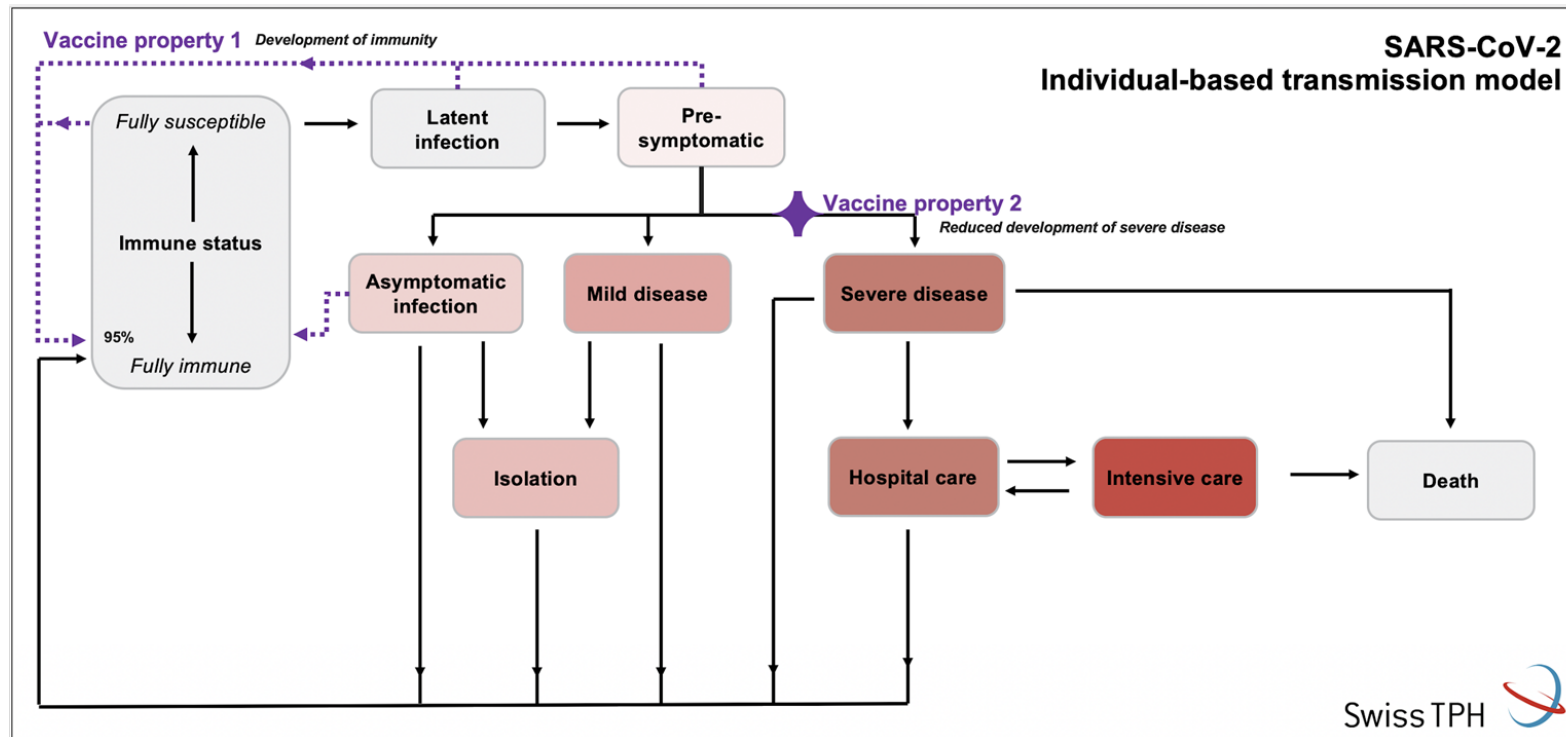
# OpenCOVID: interventions

## Non-pharmaceutical interventions

- All social distancing and facemask policies
- Testing, contact tracing, and subsequent isolation
- **Oxford Containment and Health Index by canton**
  - Reduction in effective contacts
  - A systematic, **viable** approach

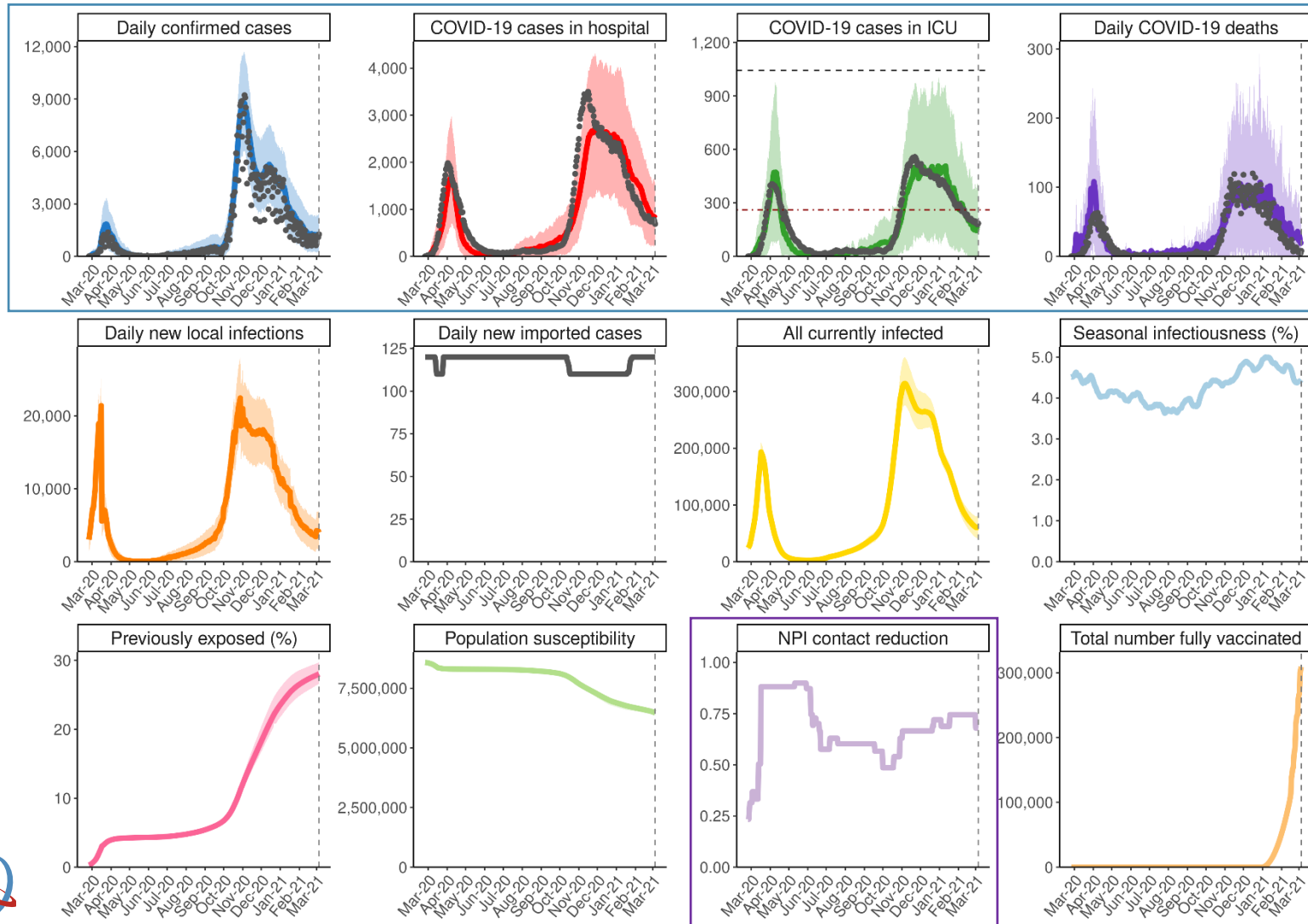
## Pharmaceutical interventions

- Represent improved therapeutics
- Represent **vaccine roll out** to priority groups
  - Development of immunity
  - Reduction of disease severity
  - Waning immunity (?)
- Implemented per FOPH guidelines



# Model calibration: effect of NPIs

Effect of NPIs is assumed proportion to the Oxford Containment and Health Index

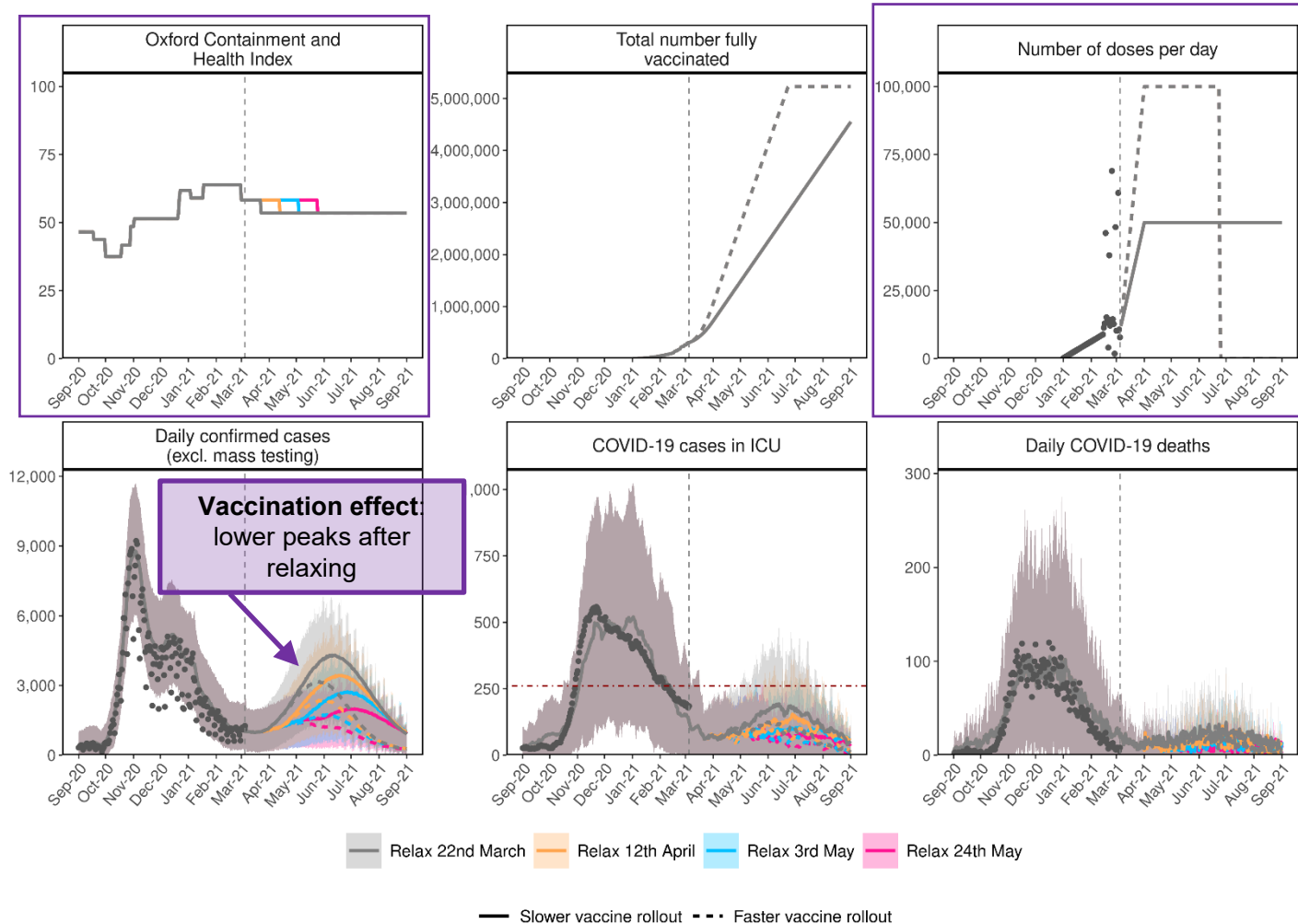


Data we align to

NPIs reduce effective contacts

# Vaccination and NPIs

What is the health gain of **delaying openings** as we **scale up vaccination**?



Approx. 5 percentage points on the OCHI

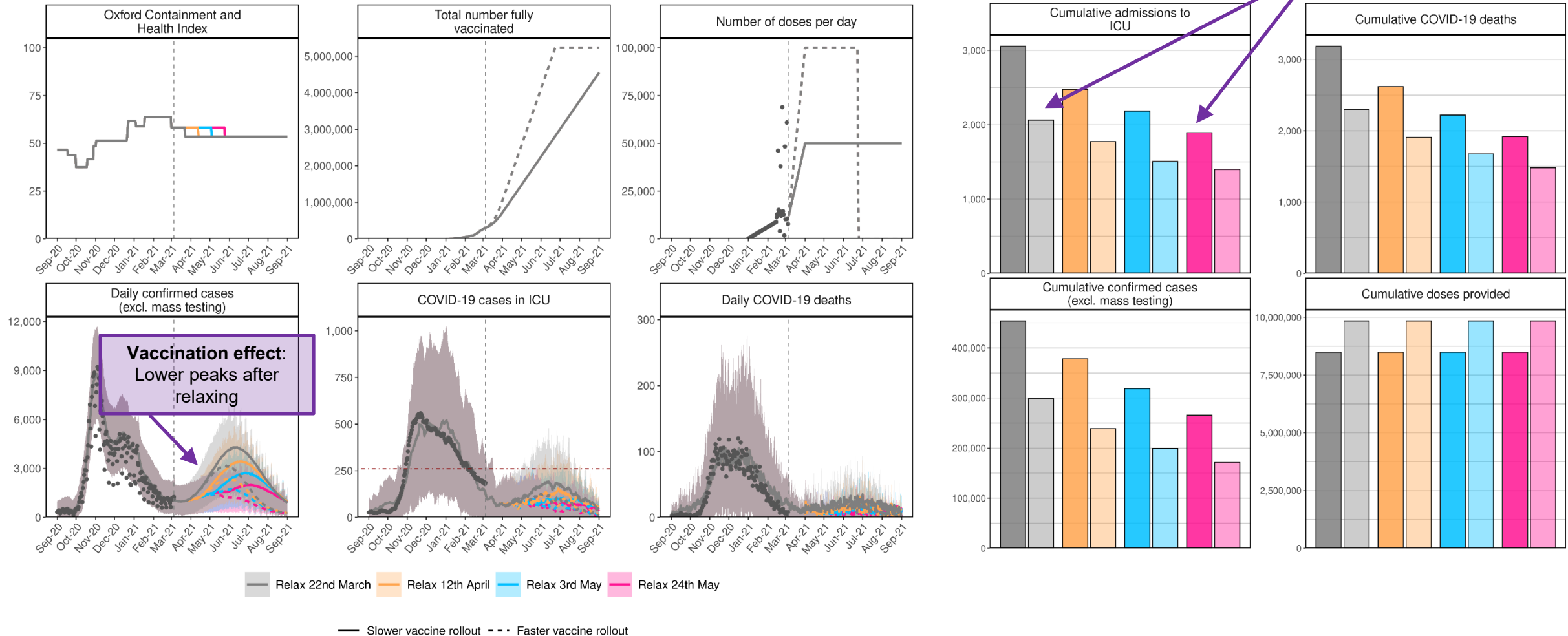
## Öffnungen

- **Private Veranstaltungen im Innenbereich:** max. 10 Personen
- **Professionelle Veranstaltungen Kultur, Freizeit und Sport:** mit Maske und Abstand, nur sitzend, Konsumation nur im Aussenbereich (s.u.), maximale Anzahl Zuschauende drinnen und (höhere Zahl) draussen und nur max. 1/3 Kapazität.
- **Sport und Kultur innen für Erwachsene:** analog Regelung Oktober 2020 (15 Personen pro Gruppe, kein Körperkontakt, kein Wettkampf; Abstand und Maske oder grosser Raum, Verbot Chormusik)
- **Bildung vor Ort innen:** Erleichterungen für Volkshochschulen, Kurse von privaten Anbietern (z.B. Pro Senectute), max. 15 Personen
- **Restaurants Aussenbereich:** mit Bedienung, nur sitzend, 4-er Tische, Abstand zwischen den Tischen, Kontakterhebung etc.
- **Läden:** Anpassung Kapazitätsbeschränkungen

# Vaccination and NPIs

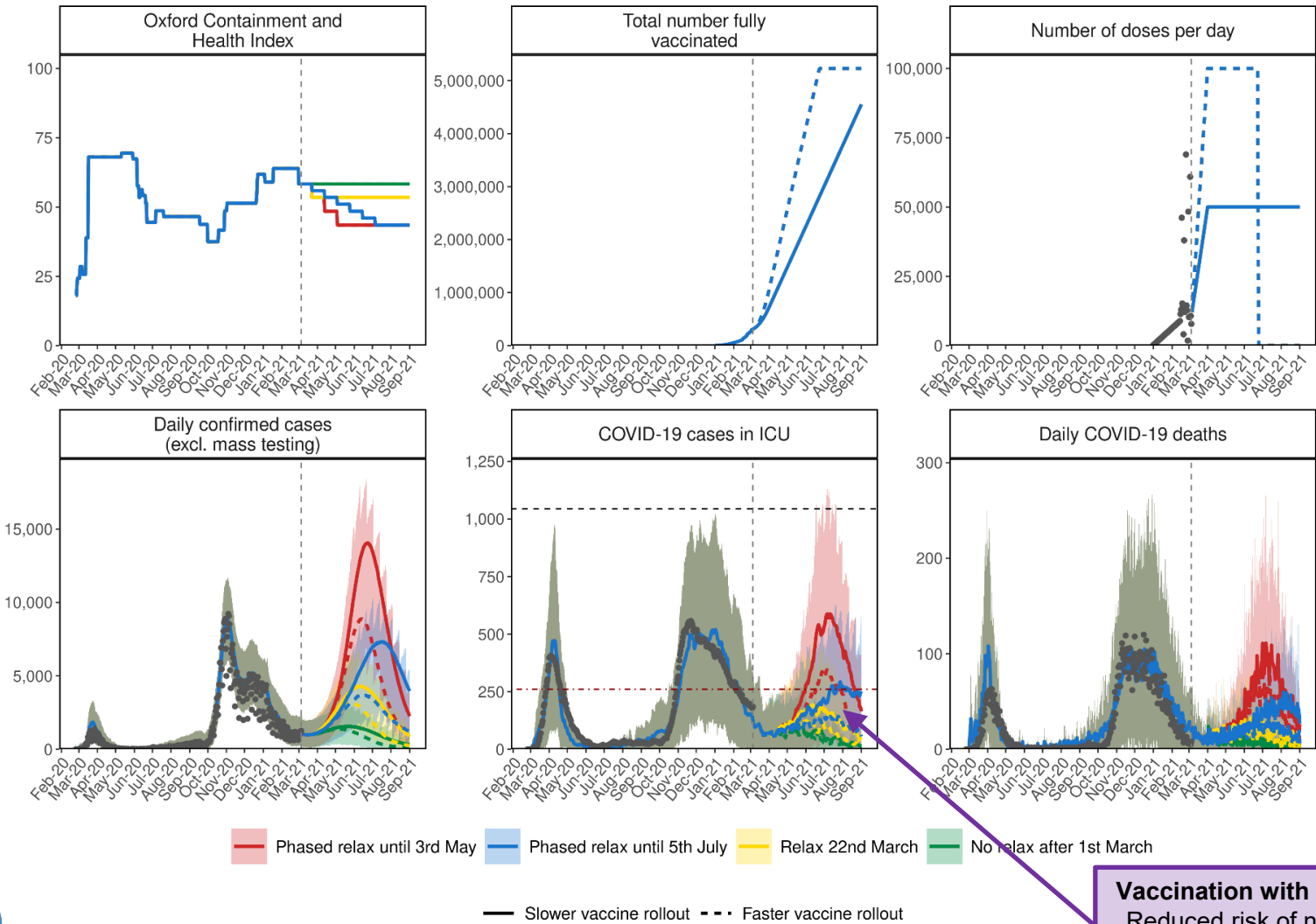
What is the health gain of **delaying openings** as we **scale up vaccination**?

**Vaccination effect:**  
Gains achieved from fast vaccination  
similar to gains from 2-3 month  
delayed openings



# Vaccination and NPIs

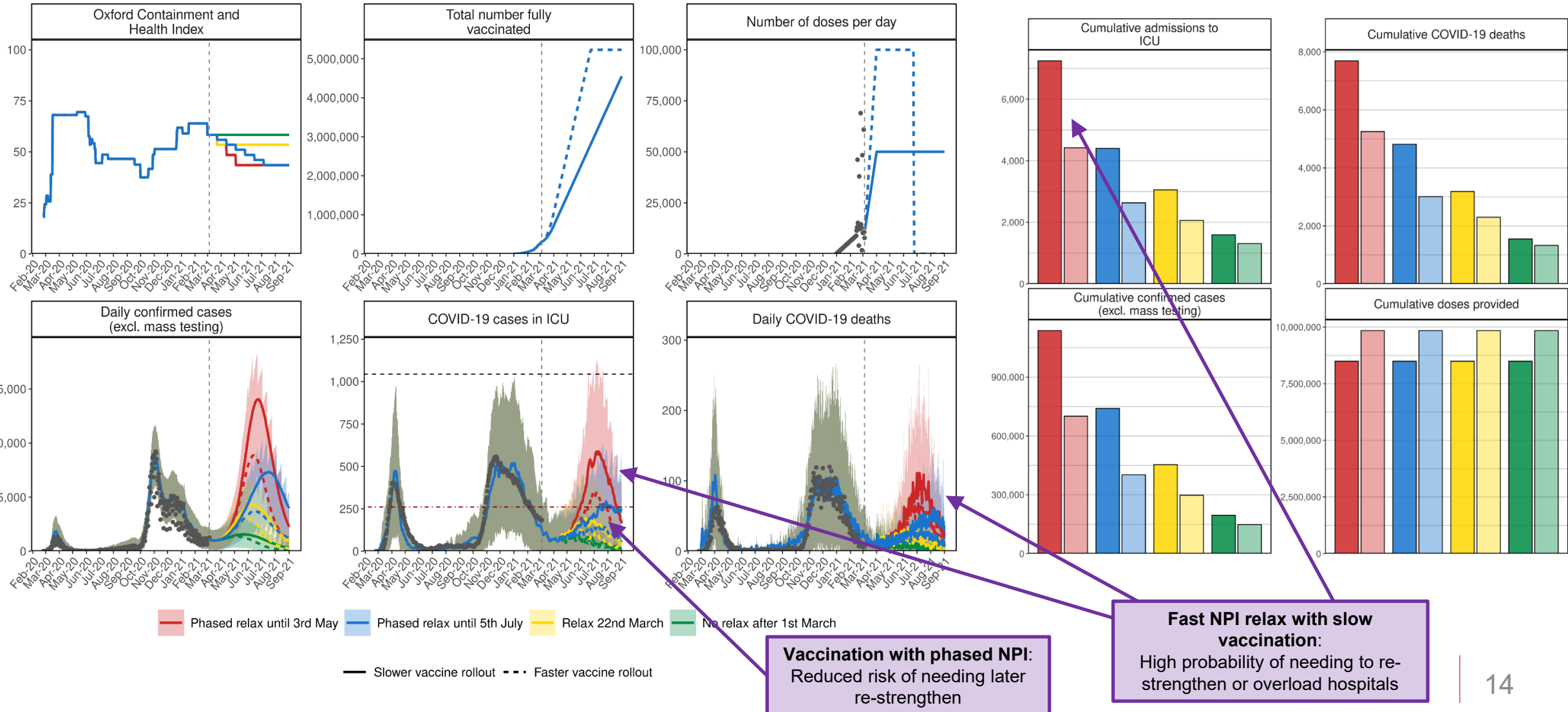
Comparing scenarios: the **relative comparison** more useful than absolute numbers



**Vaccination with phased NPI:**  
Reduced risk of needing later re-strengthen

# Vaccination and NPIs

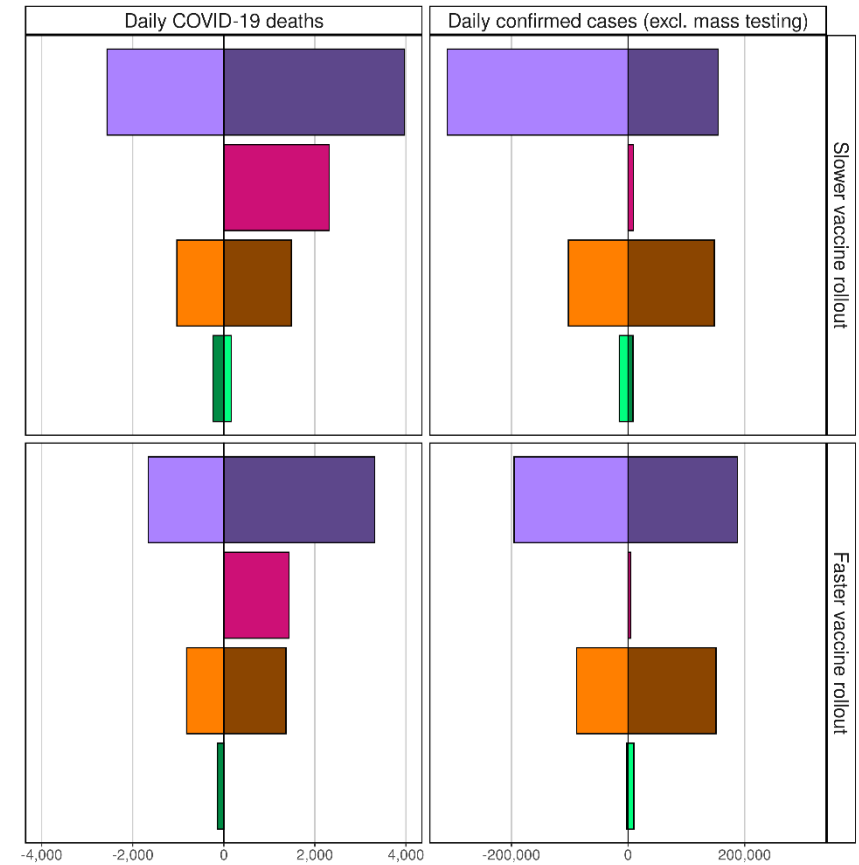
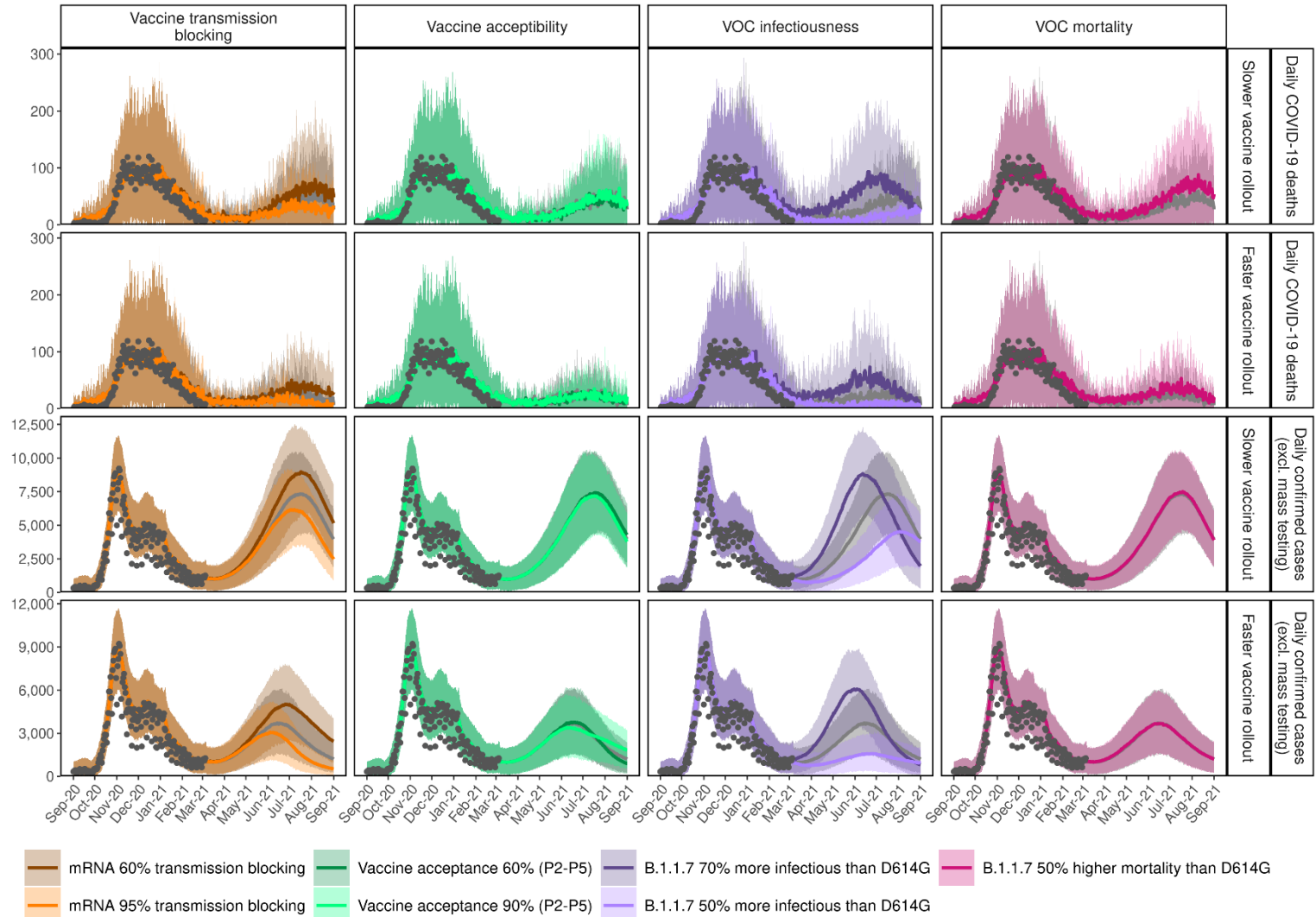
Comparing scenarios: the **relative comparison** more useful than absolute numbers





# The key uncertainties

What assumption have a **major impact** of these findings?





# Take away messages

- Modelling **is not** a crystal ball
  - We cannot know exactly what will happen in the future
  - New evidence comes to light – models are updated accordingly
  - New interventions, changes in scope of current interventions
- Modelling can provide quantitative evidence about **relative effects**
  - Eg effects of delaying relaxation steps
- Modelling can provide quantitative evidence about **trade offs and synergies**
  - Eg how vaccination speed can enable flexibility to relax measures faster

# Take away messages

- We **do not** tell decision makers what to do
  - Modelling is **one part** of the evidence used by decision makers to make **informed decisions**
- We do not have statistical power to comment of **explicit measures** (eg opening restaurants, back to office)
- A **fast vaccination campaign** into the summer enables **more flexibility to relax NPIs without later needing to restrengthen**
- Increased infectiousness of new viral variants is key – **genomic surveillance** is critical

# Thank you for your attention



**Andrew  
Shattock**



**Epke  
Le Rutte**



**Robert  
Dünner**



**Swapnoleena  
Sen**



**Sherrie  
Kelly**



**Nakul  
Chitnis**



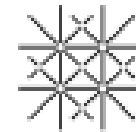
**Melissa  
Penny**



Botnar Research  
Centre for  
Child Health



SWISS NATIONAL SCIENCE FOUNDATION



University  
of Basel

**sciCORE**  
Center for scientific computing

And collaborators at:

- Swiss National COVID-19 Science Task Force
- Swiss Federal Office of Public Health