COVID-19 TESTING PROTOCOLS AT SCHOOLS

Vittoria Colizza
INSERM
Sorbonne Université
Paris, France

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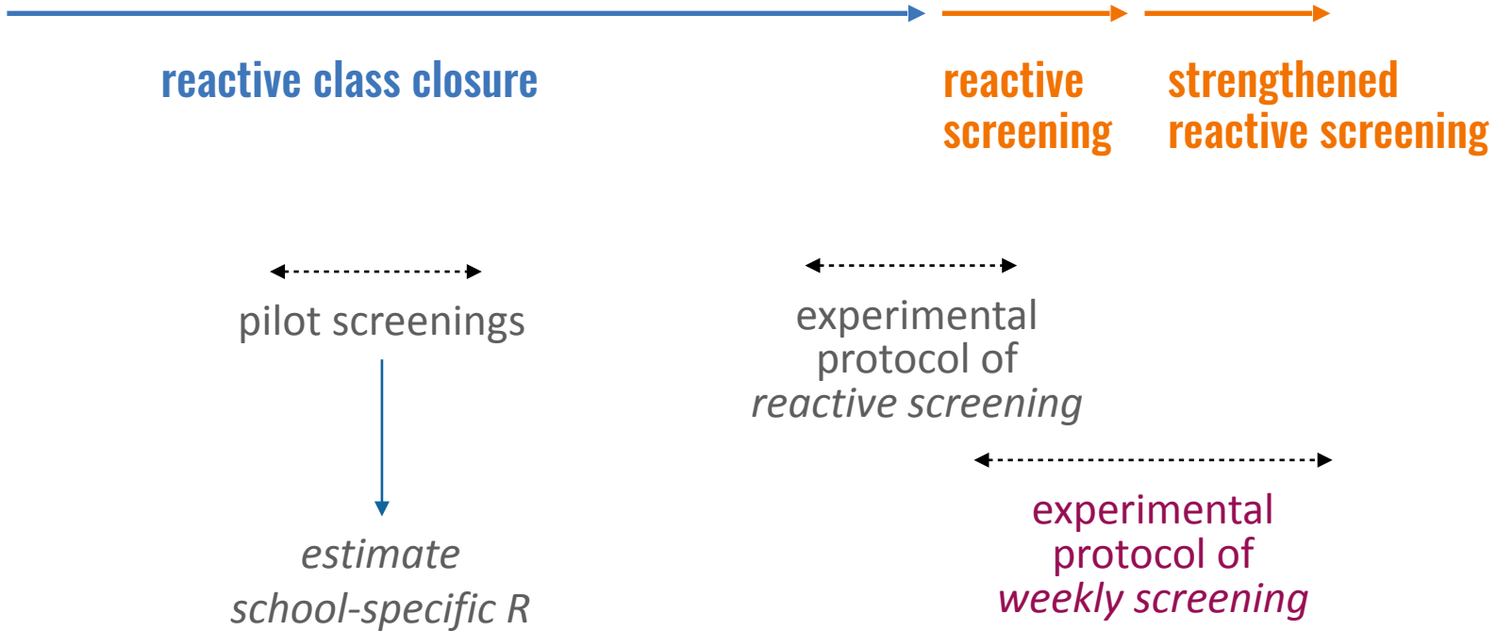
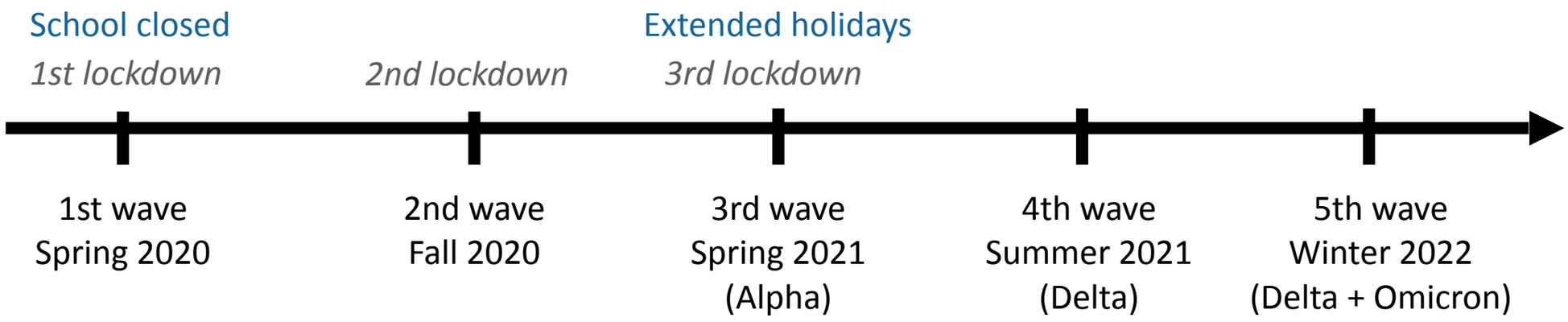
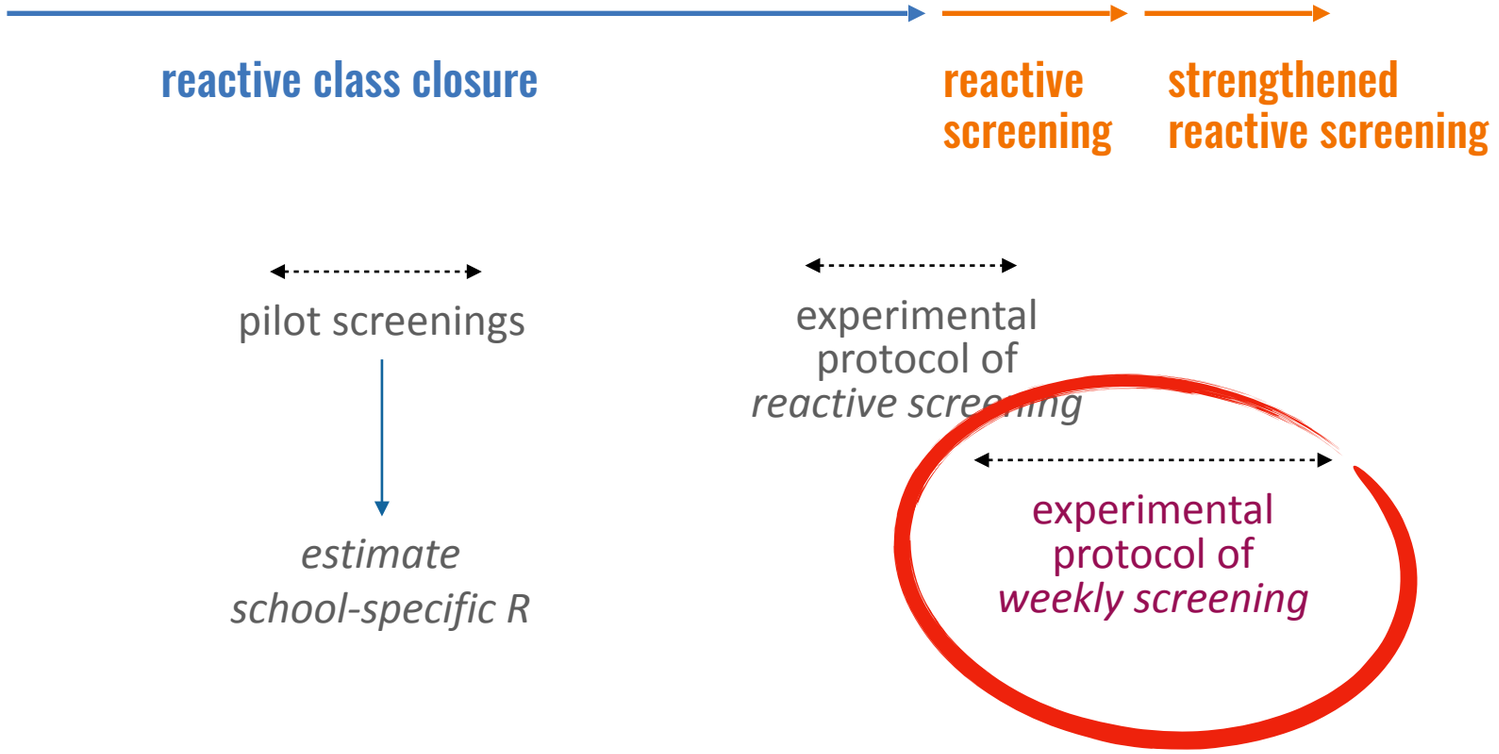
School protocols in France during the pdm



School protocols in France during the pdm





Modeling study

ESTIMATE
transmission

EVALUATE
protocols

MINIMIZE
closure

OPTIMIZE
resources

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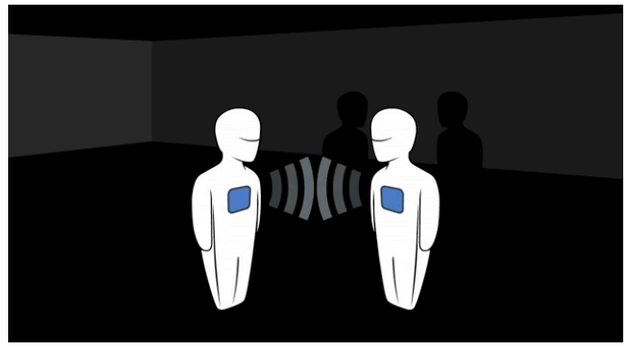
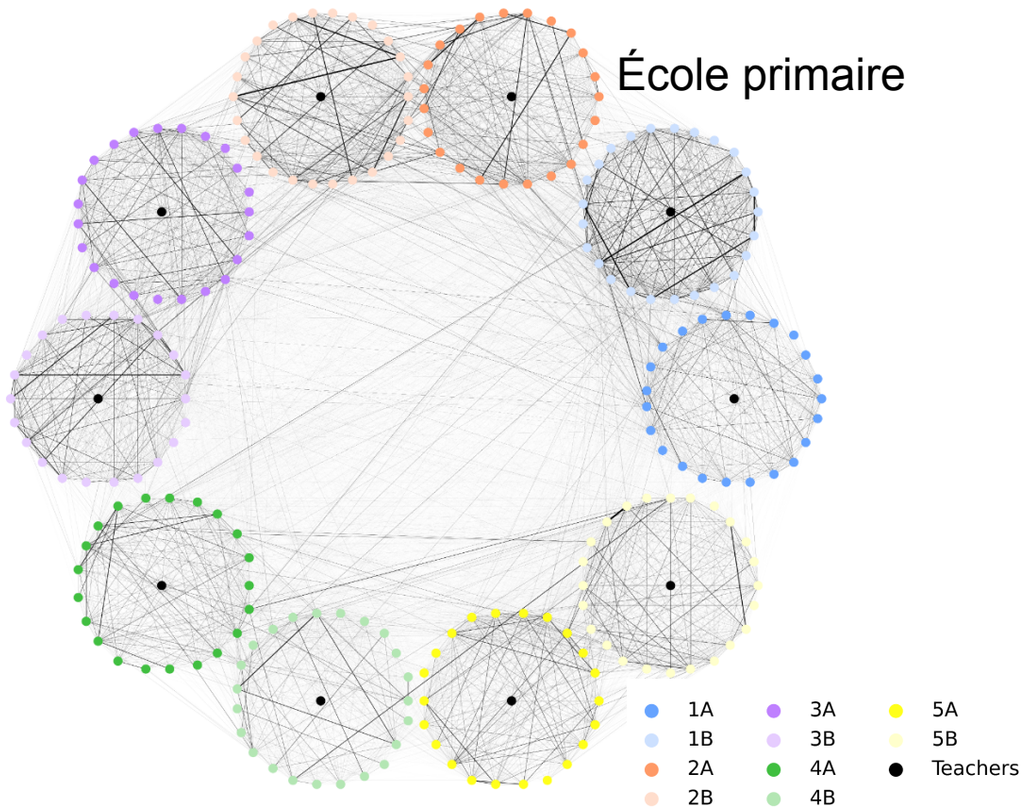
Empirical contact data

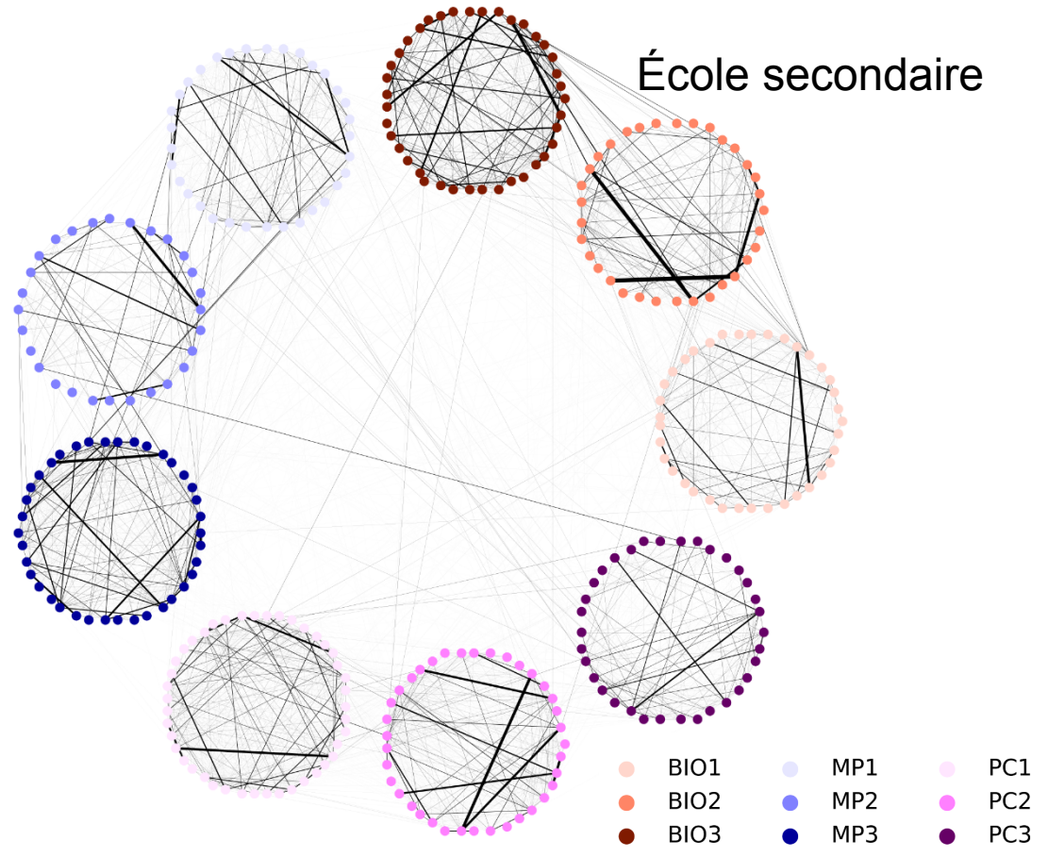
Proximity contact data collected in France through RFID sensors during the pre-pandemic period in:

- **primary school** (232 students, 10 classes)
- **classes préparatoires** (327 students, 9 classes)



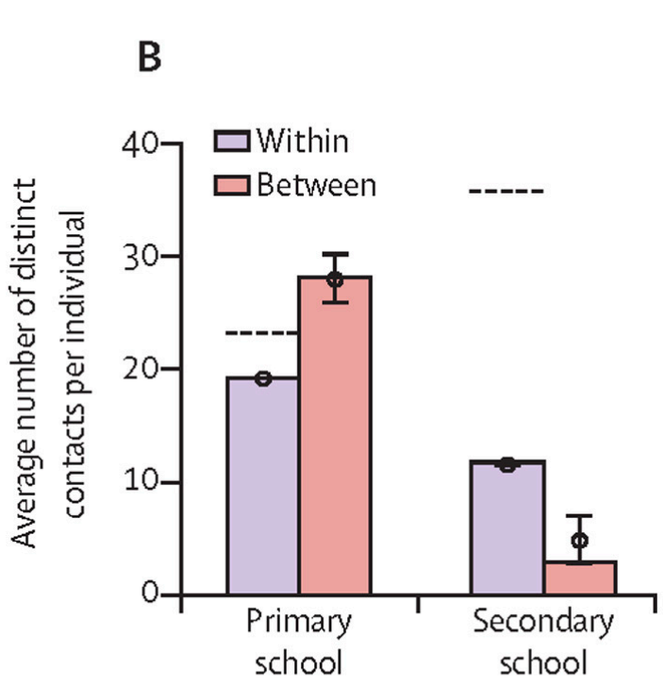
sociopatterns.org

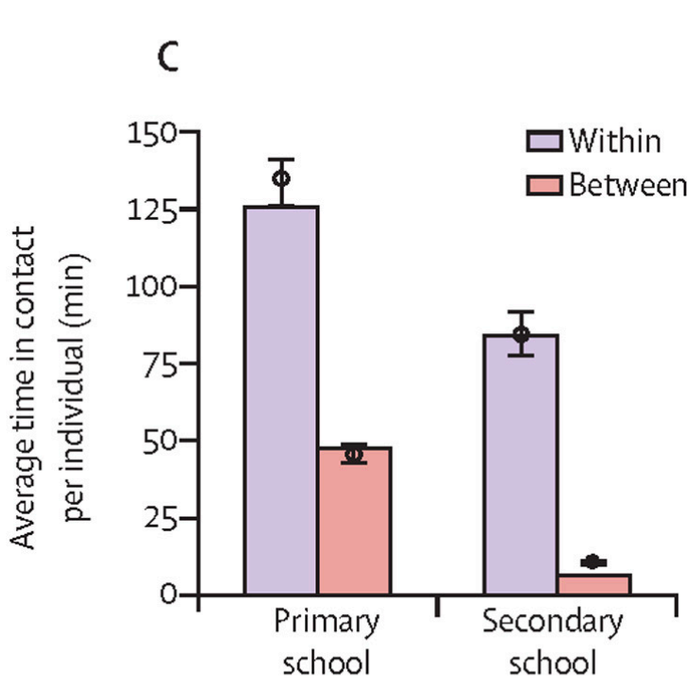


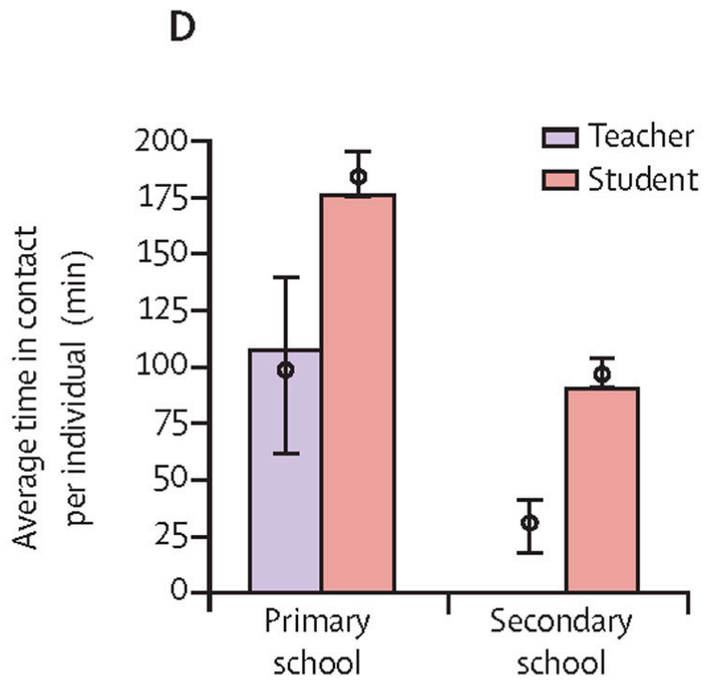


Sociopatterns.org; Stehle et al 2011; Mastrandrea et al 2015

Empirical contacts —> synthetic networked populations







Colosi et al. Lancet Inf Dis 2022

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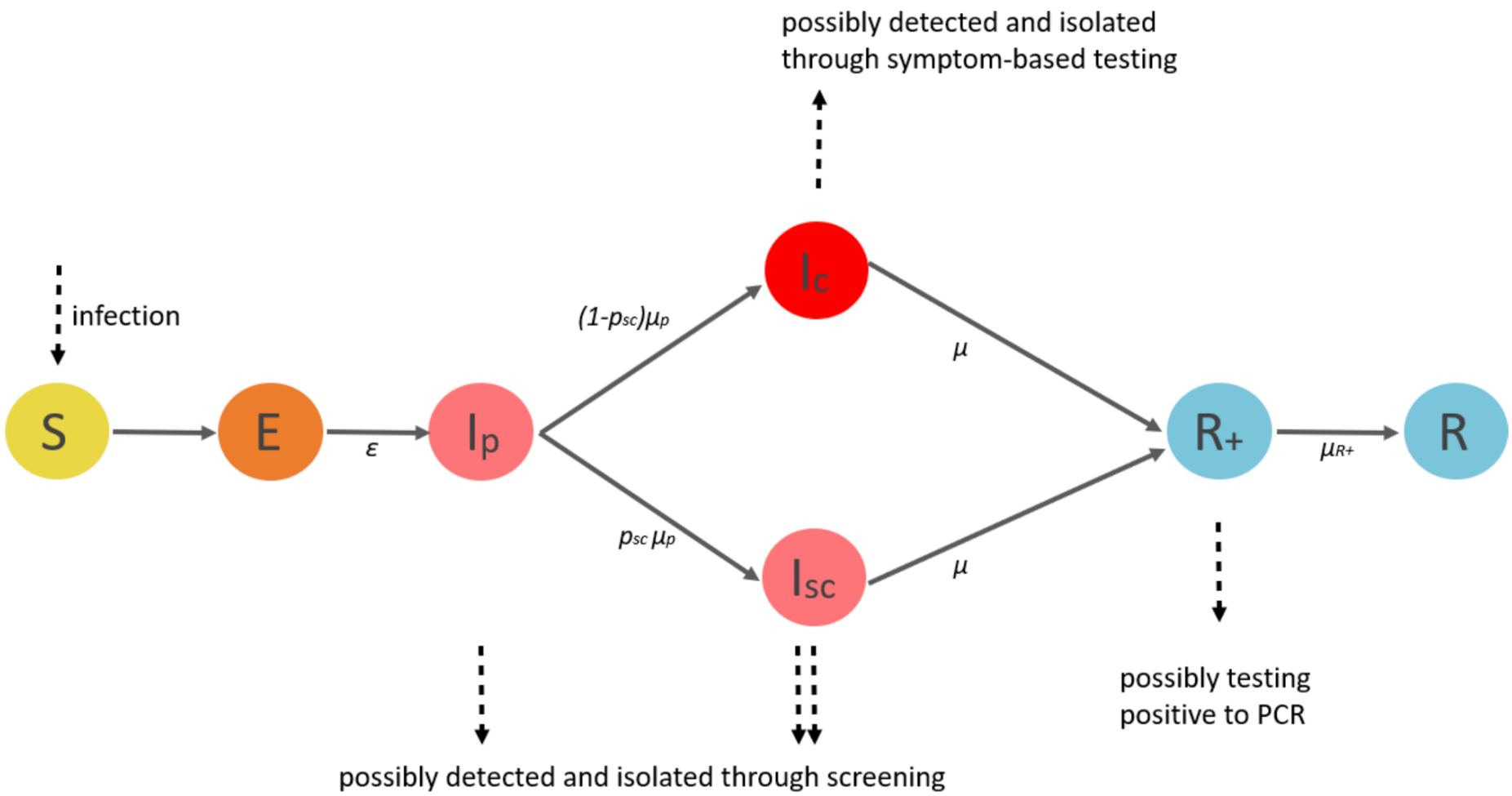
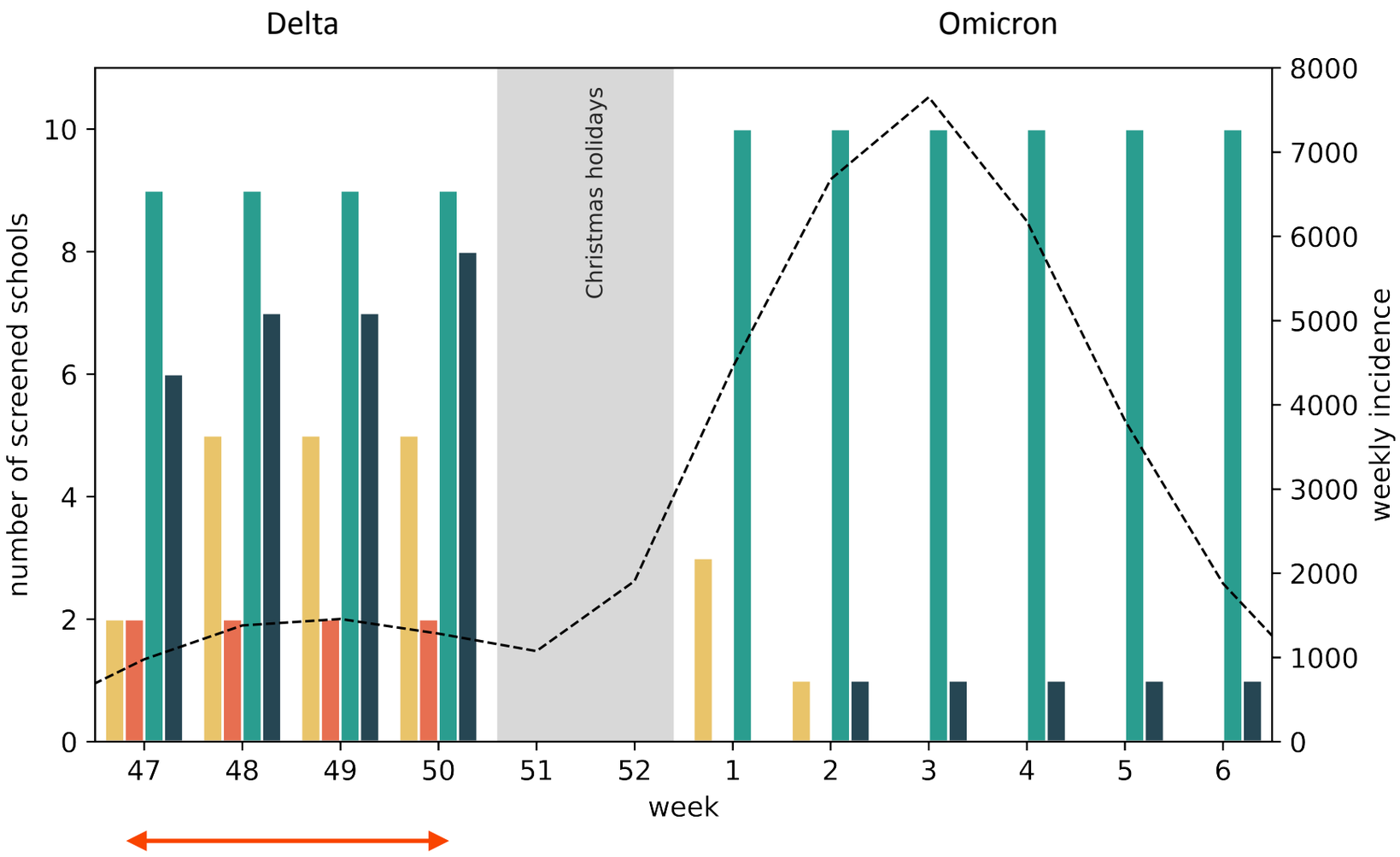
Transmission model



- lower susceptibility and probability of clinical cases in children
- lower detection rate of clinical cases in children
- test sensitivity over time specific to test type (+ age, clinical/subclinical)
- age-specific contacts (number, duration, preference, time, …)
- variant-specific dwell time distributions

Experimental weekly screening, Delta wave (winter 2021)



Auvergne-Rhône-Alpes region

weekly screenings in 25 schools:

28,643 tests

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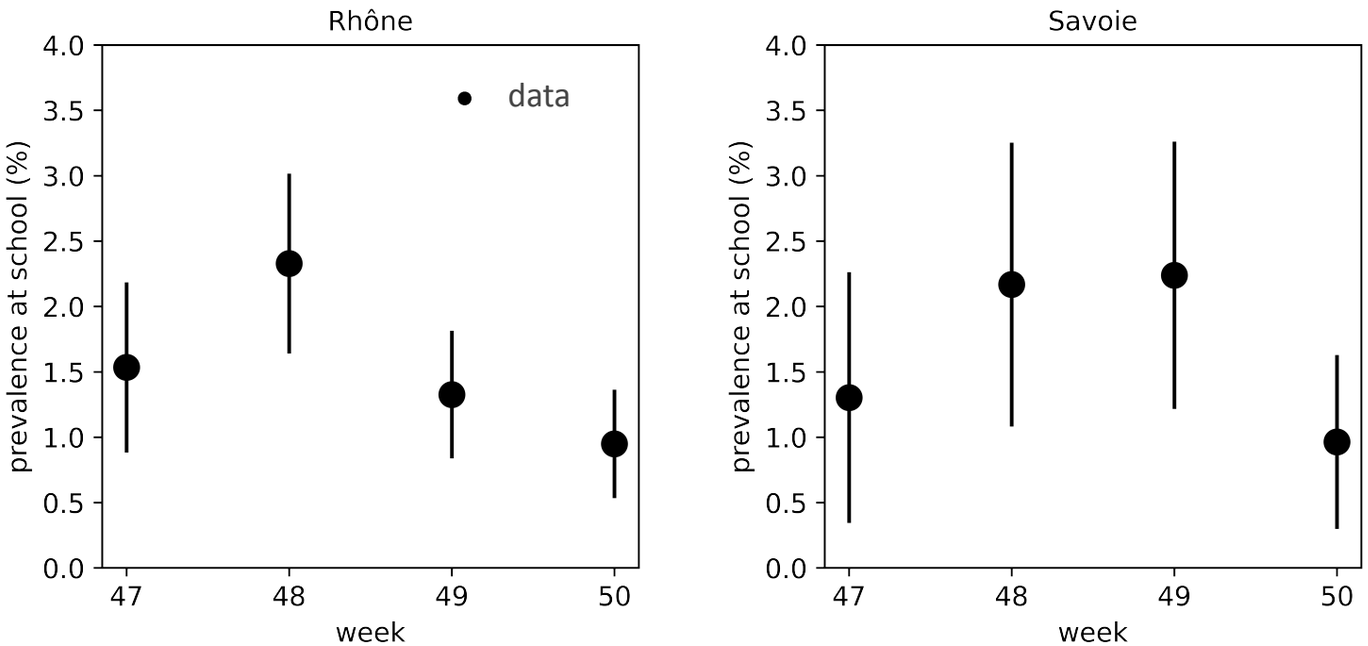
Testing data



Tests

departments	W47	W48	W49	W50
Isère	468	916	935	784
Puy-de-Dôme	337	299	311	283
Rhône	1369	1847	2111	2107
Savoie	537	692	804	830

Tests +

departments	W47	W48	W49	W50
Isère	4	3	25	1
Puy-de-Dôme	3	6	2	0
Rhône	21	43	28	20
Savoie	7	15	18	8

Adherence

departments	W47	W48	W49	W50
Isère	58.2	61.8	64.7	52.9
Puy-de-Dôme	73.9	65.7	68.7	63.2
Rhône	58.7	68.1	81.5	82.1
Savoie	58.9	65.1	75.4	68.4

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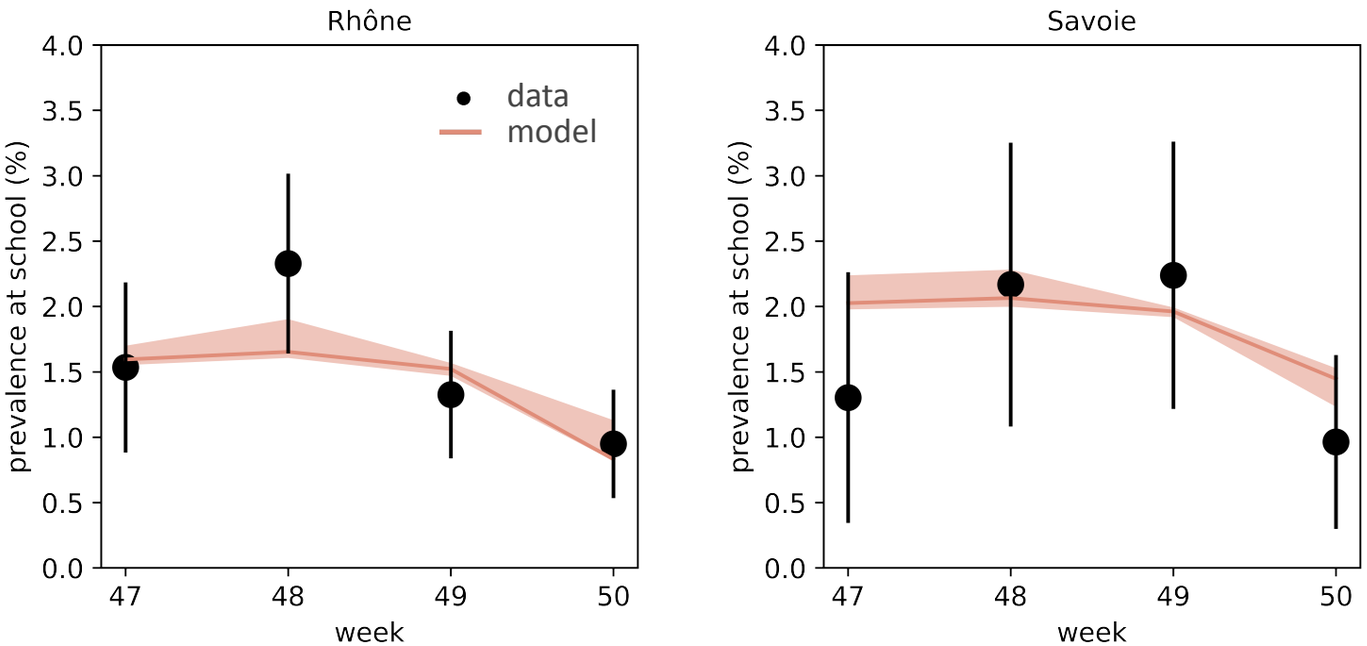
Max likelihood inference of transmission per-contact



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$$L(\text{Data}\,|\,\Theta) = \prod_{\text{dep}} \prod_{w=47}^{50} P_{\text{Binomial}}\left(n_{\text{obs}}(w); p_{\text{pred}}(w),\ \beta\right)$$

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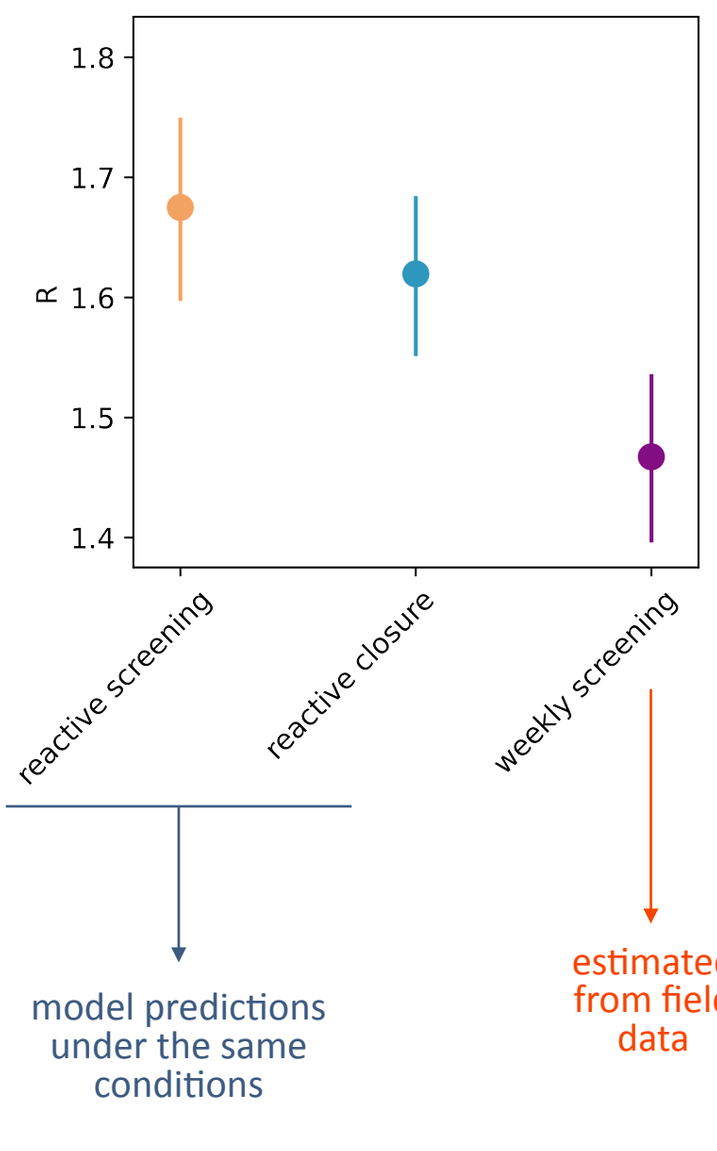
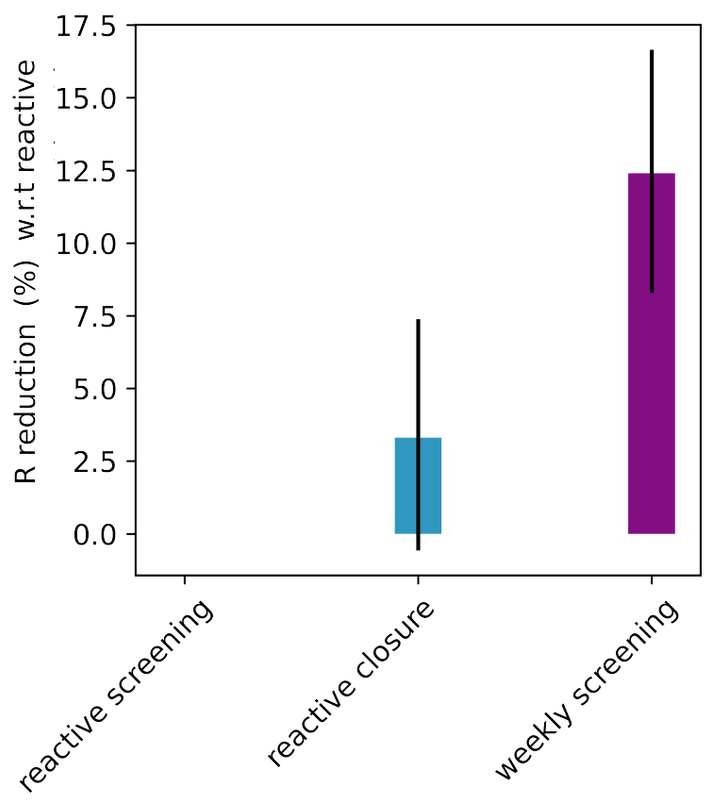
Weekly screening vs. reactive strategies





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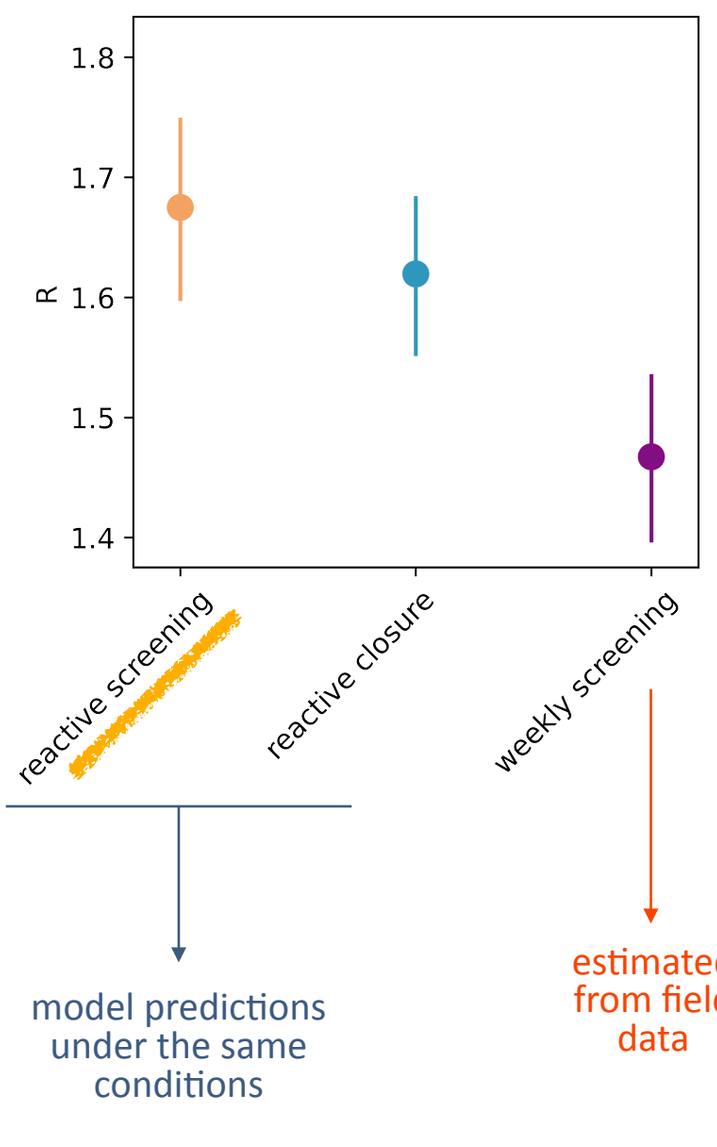

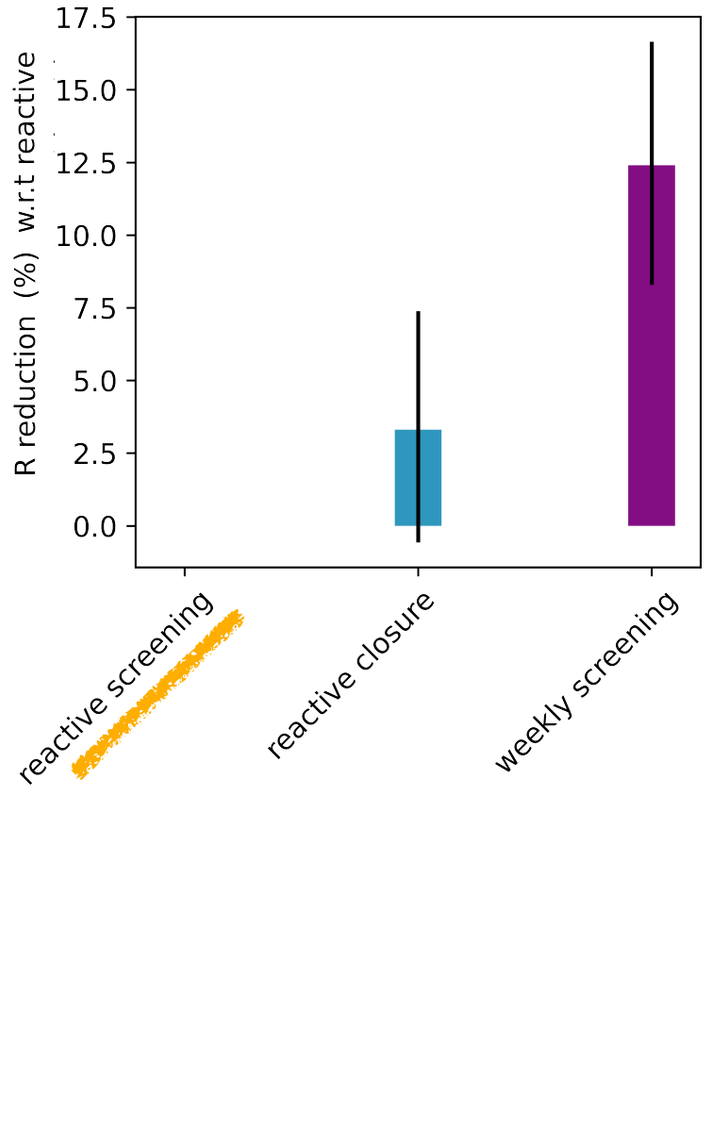

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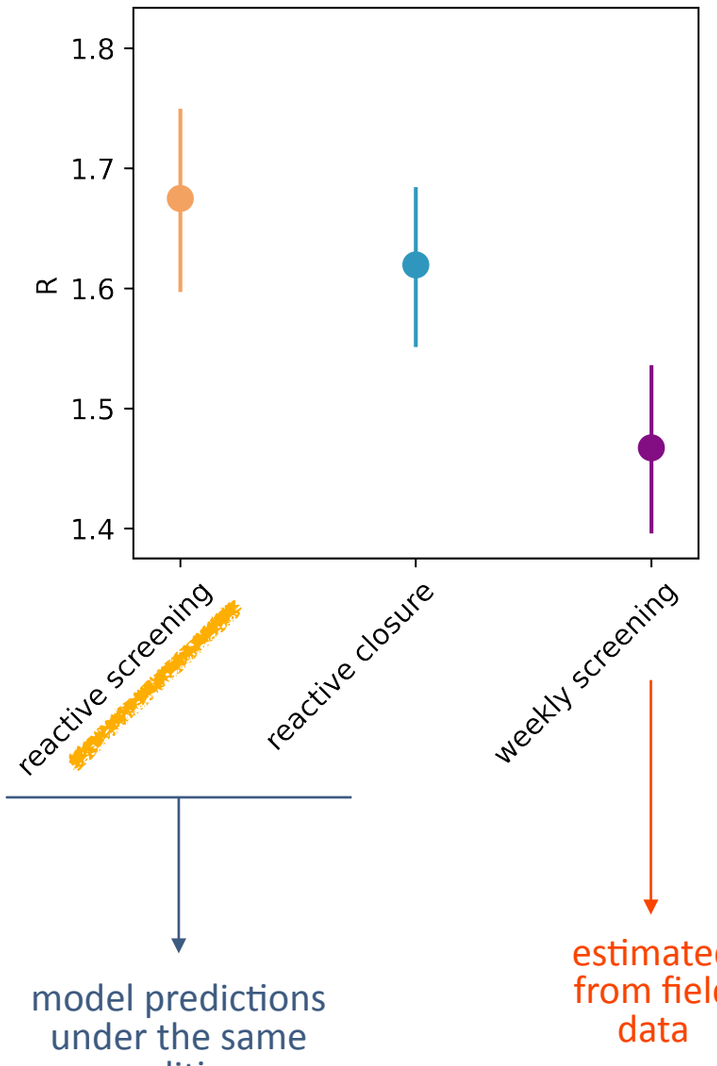

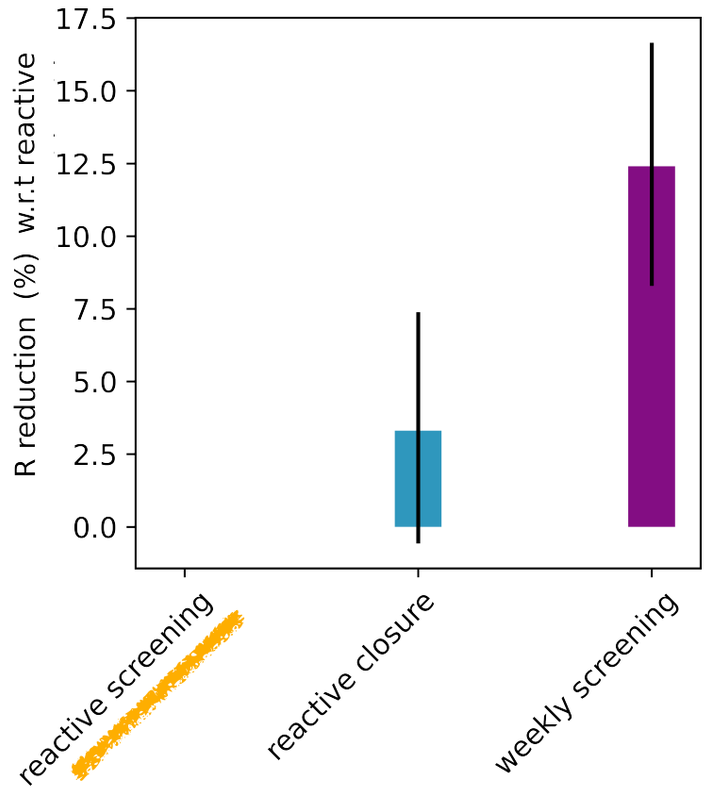

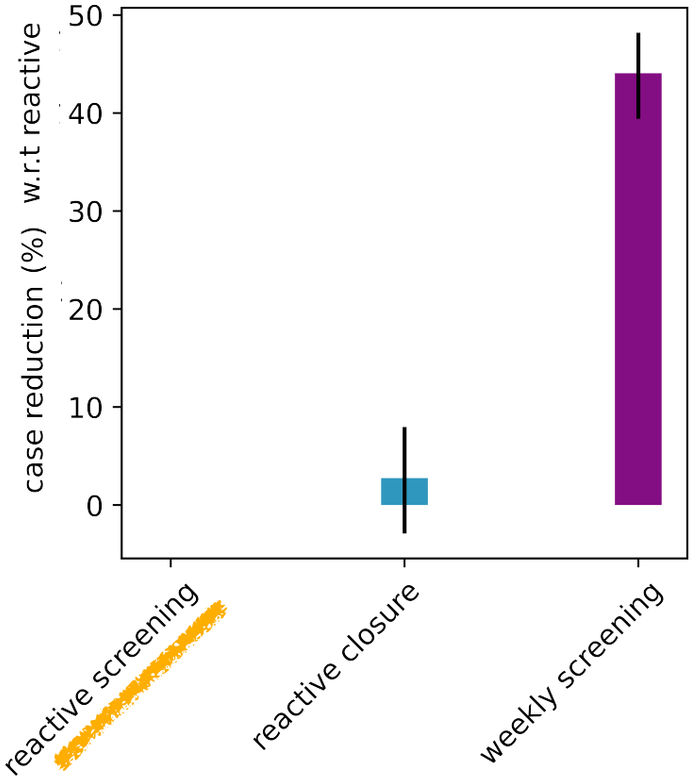

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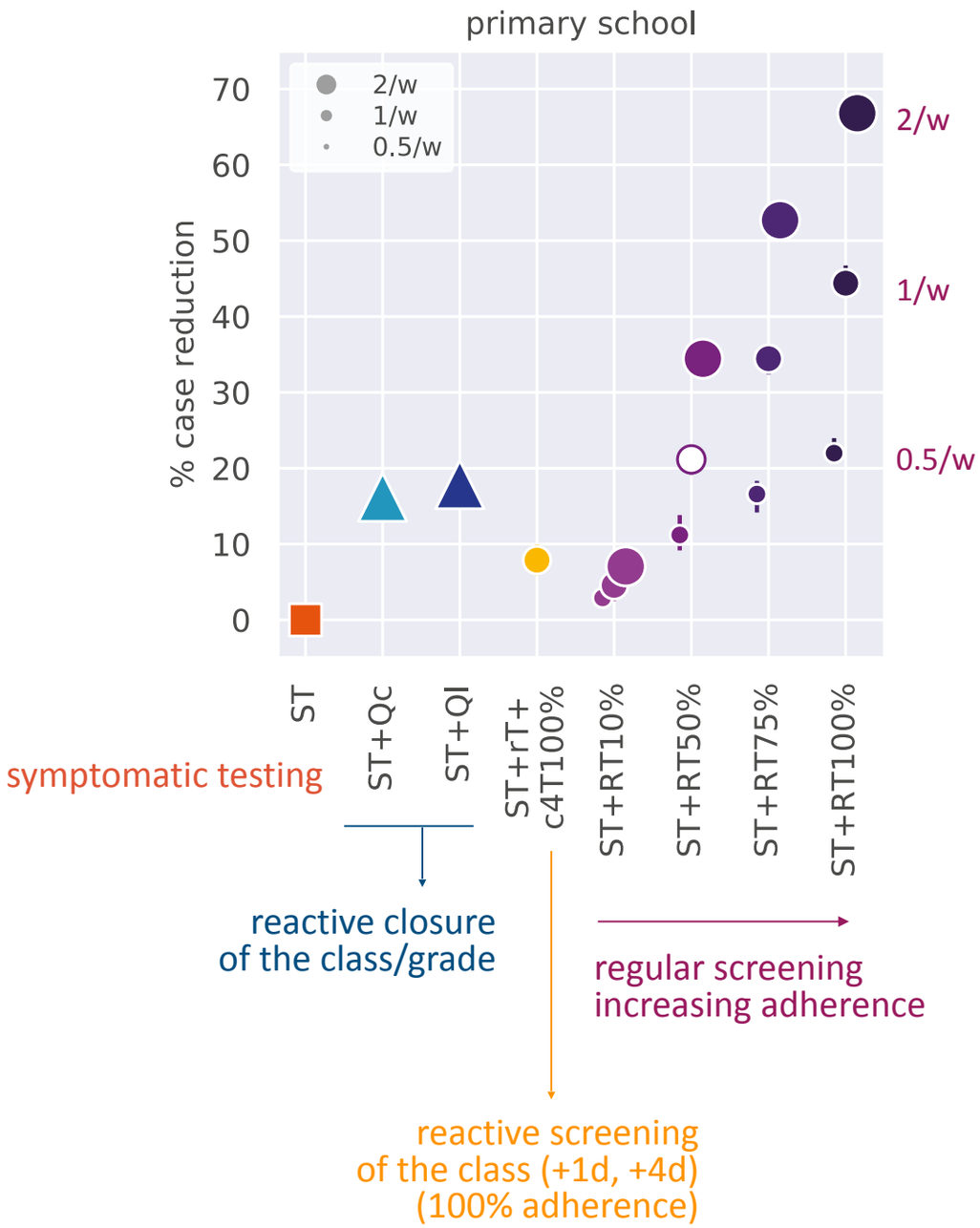
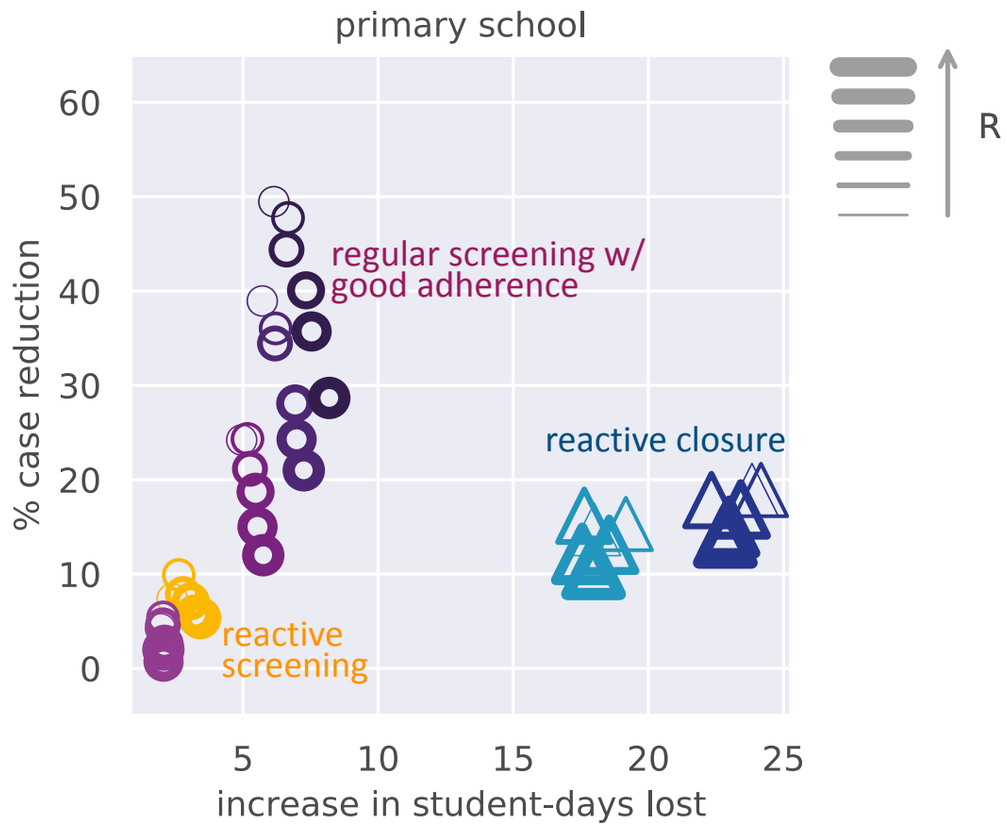
Assessing protocols





- variants
- introduction conditions
- vaccination coverage (teachers, students)
- # control screenings

Colosi et al. Lancet Inf Dis 2022

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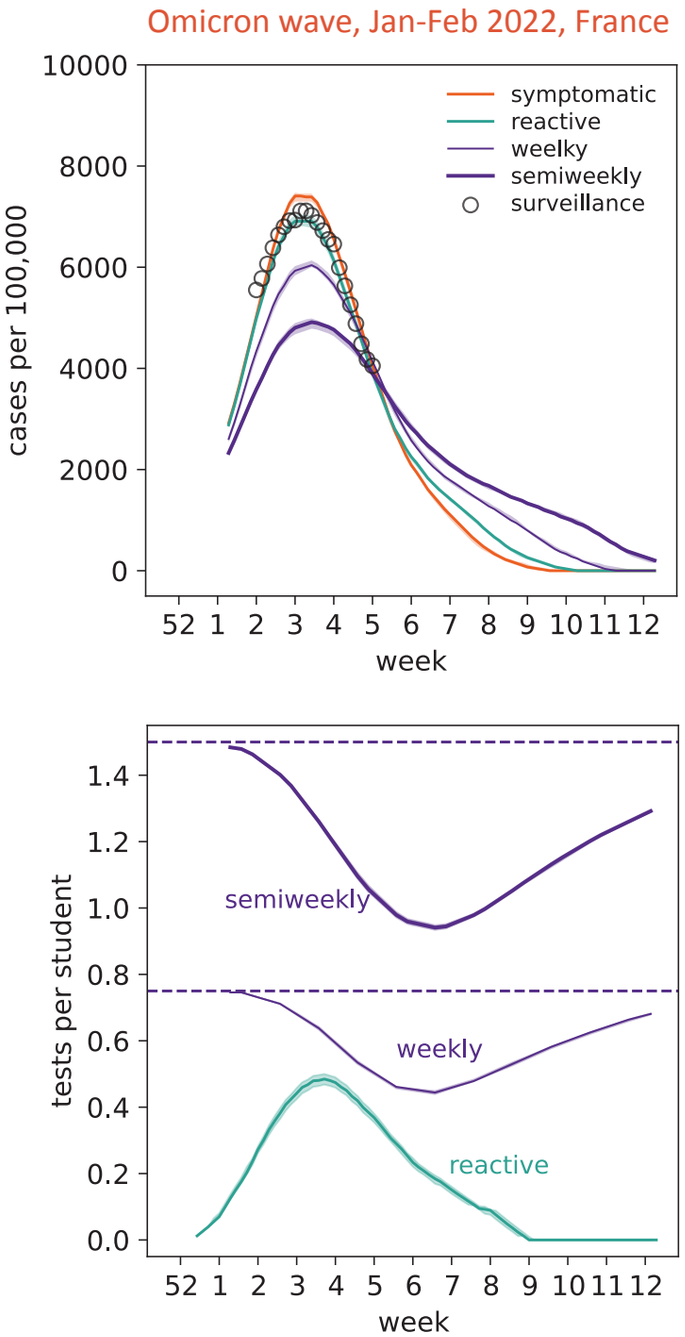
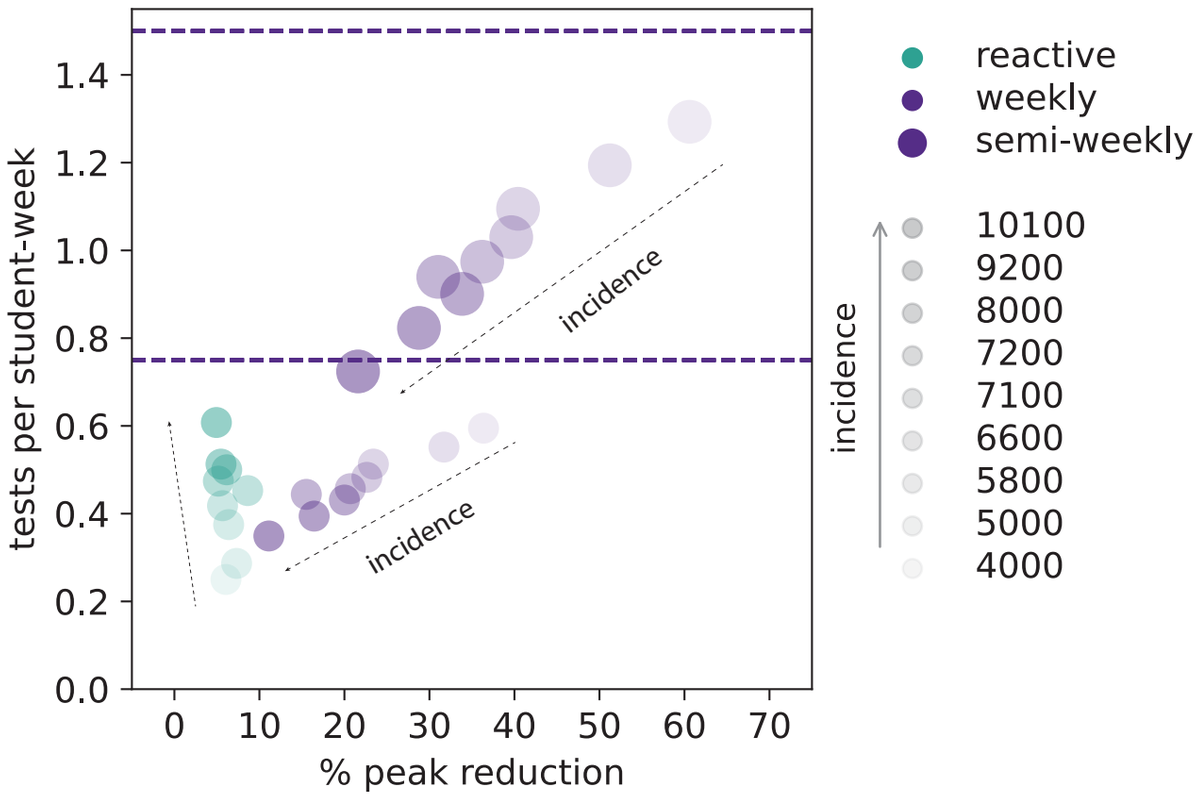
Testing protocols for varying incidence conditions





Colosi et al. https://www.medrxiv.org/content/10.1101/2022.02.04.22270473v1

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www.epicx-lab.com/covid-19.html

Giulia Bassignana
Elisabetta Colosi
Giulia de Meijere
Laura Di Domenico
Jonggul Lee
Davide Maniscalco
Mattia Mazzoli
Canelle Poirier
Giulia Pullano
Albano Rlkani
Chiara E Sabbatini

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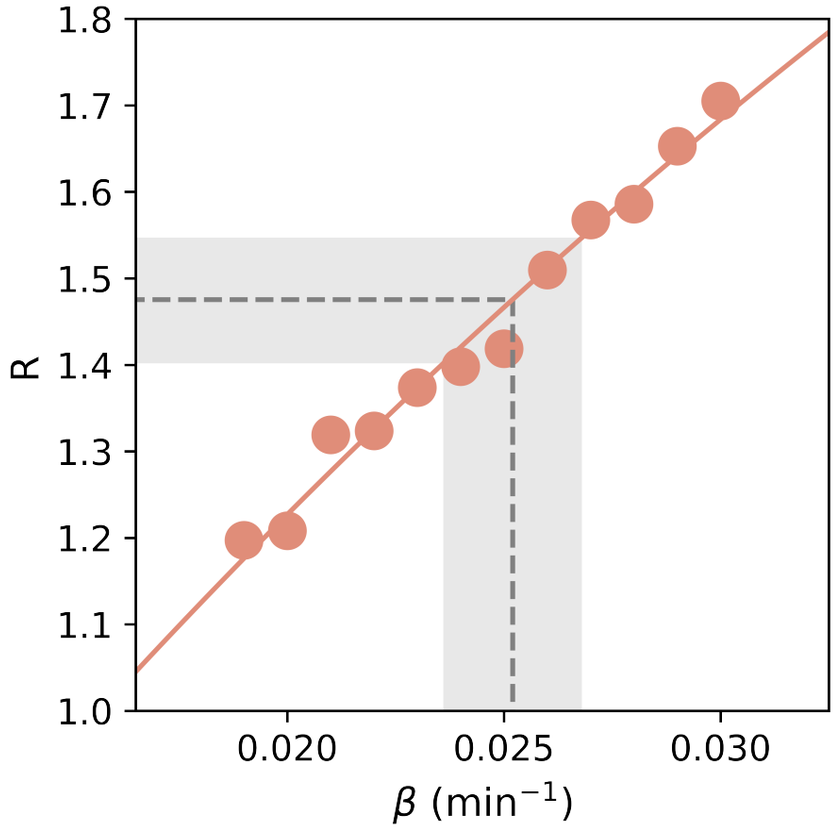
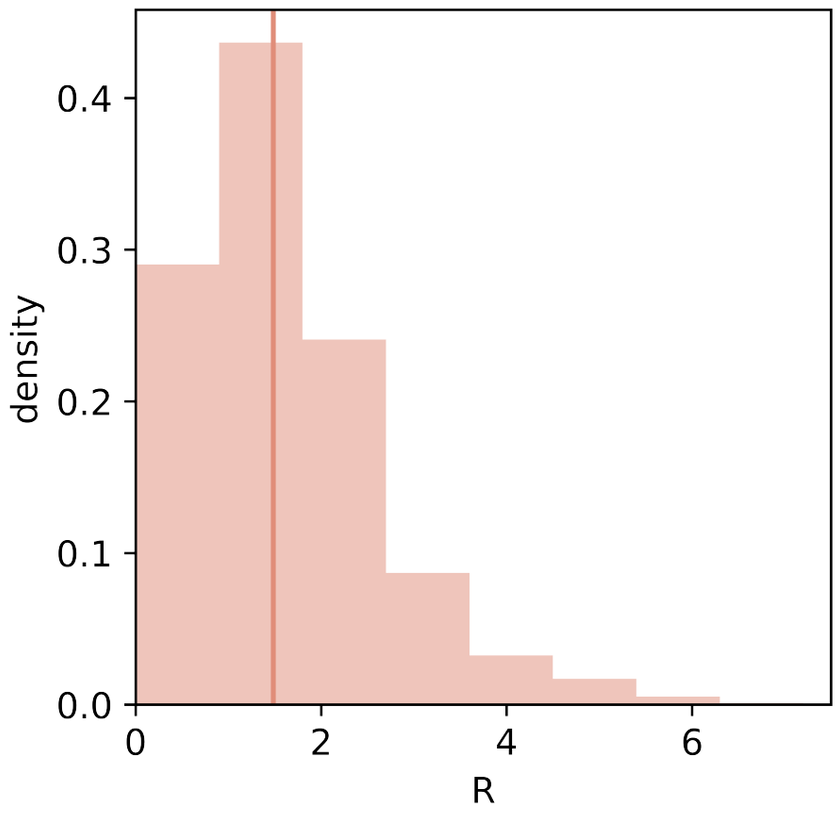


$$R = a\left(1 - e^{-b\beta}\right)$$



Overdispersion parameter
k = 0.67 (95%CI 0.60 – 0.75)