HARVARD T.H. CHAN SCHOOL OF PUBLIC HEALTH

What works, and Challenges of delays in epidemics

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NBER

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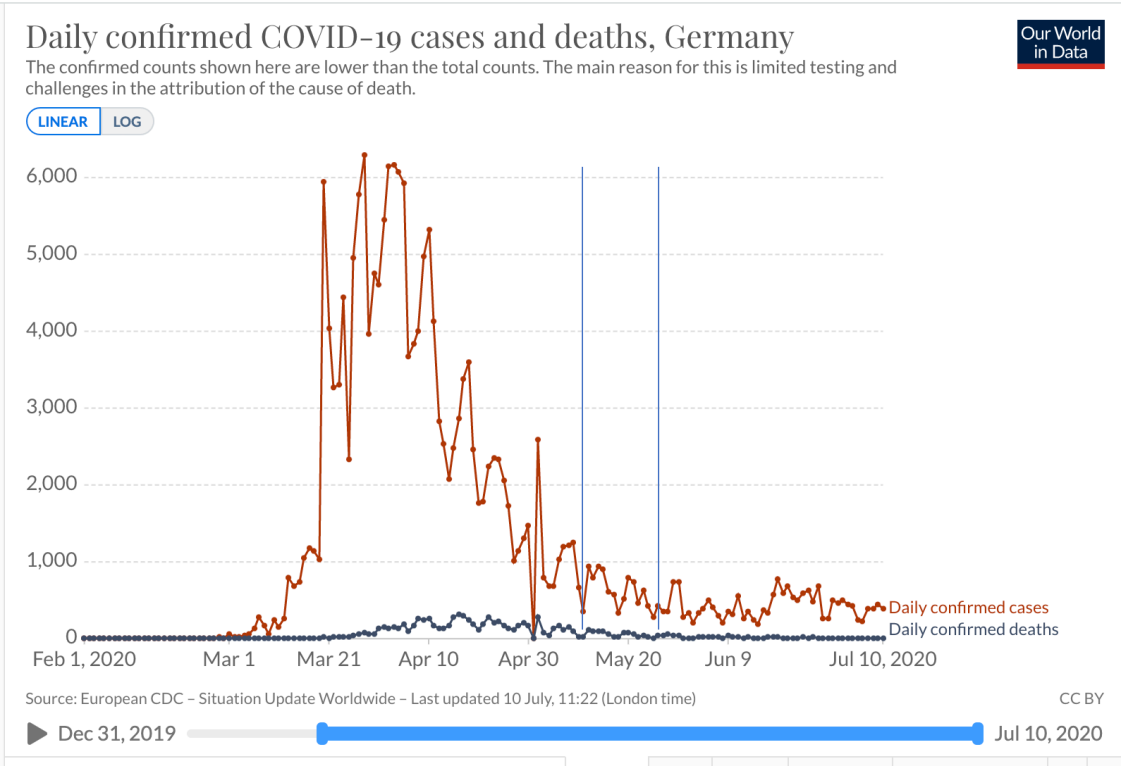
Models of Infectious Disease Agent Study

MIDAS

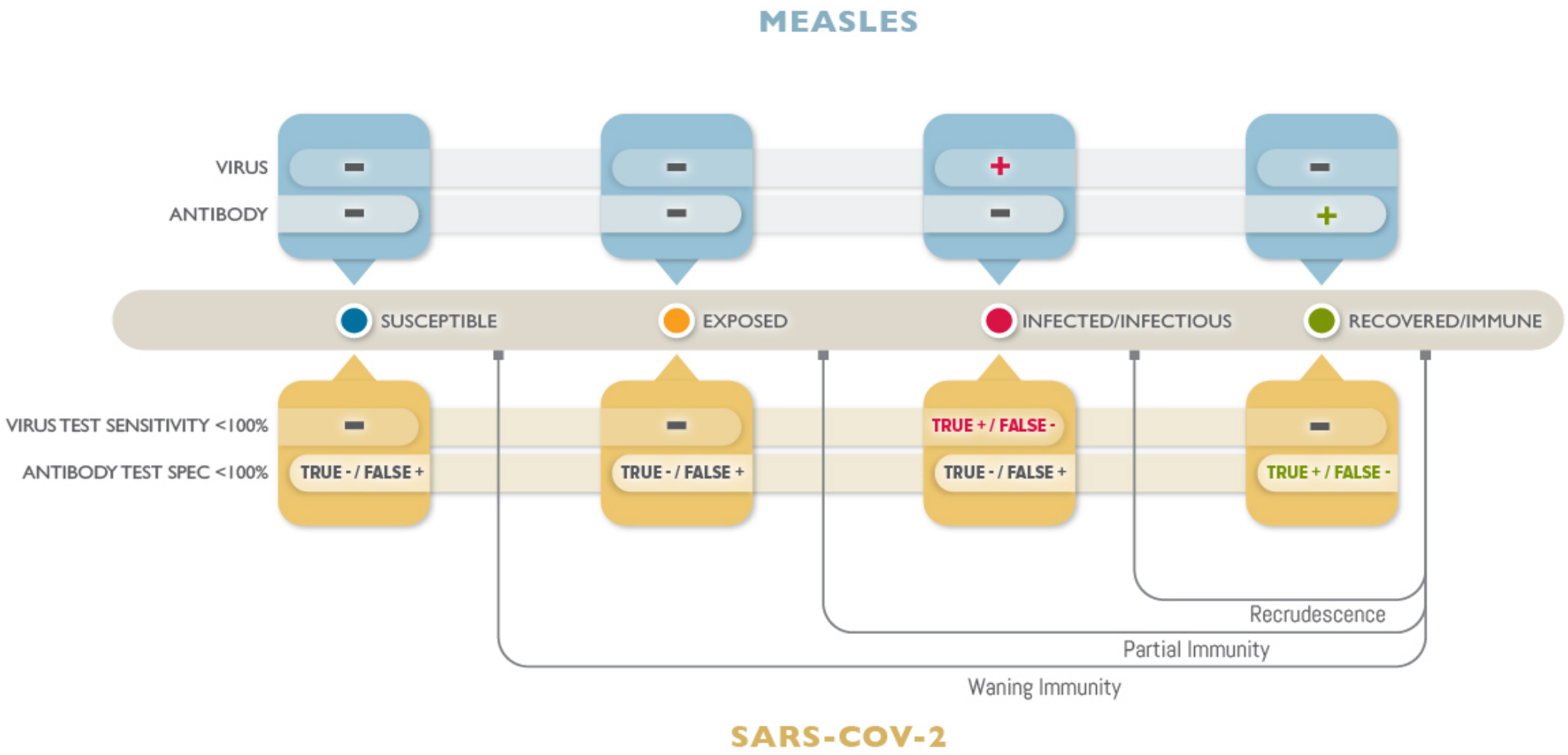
Funded by the National Institutes of Health

What works?

- Economically crippling lockdowns can keep R(t) below 1 (if followed)
- Modest reopening in summer can happen with R(t) under control
- Infection control in nursing homes can keep mortality in check
- Not clear: how far can you go with reopening and keep R(t)~1?
- How does it scale with absolute case numbers?
- How much will seasonality make it harder?

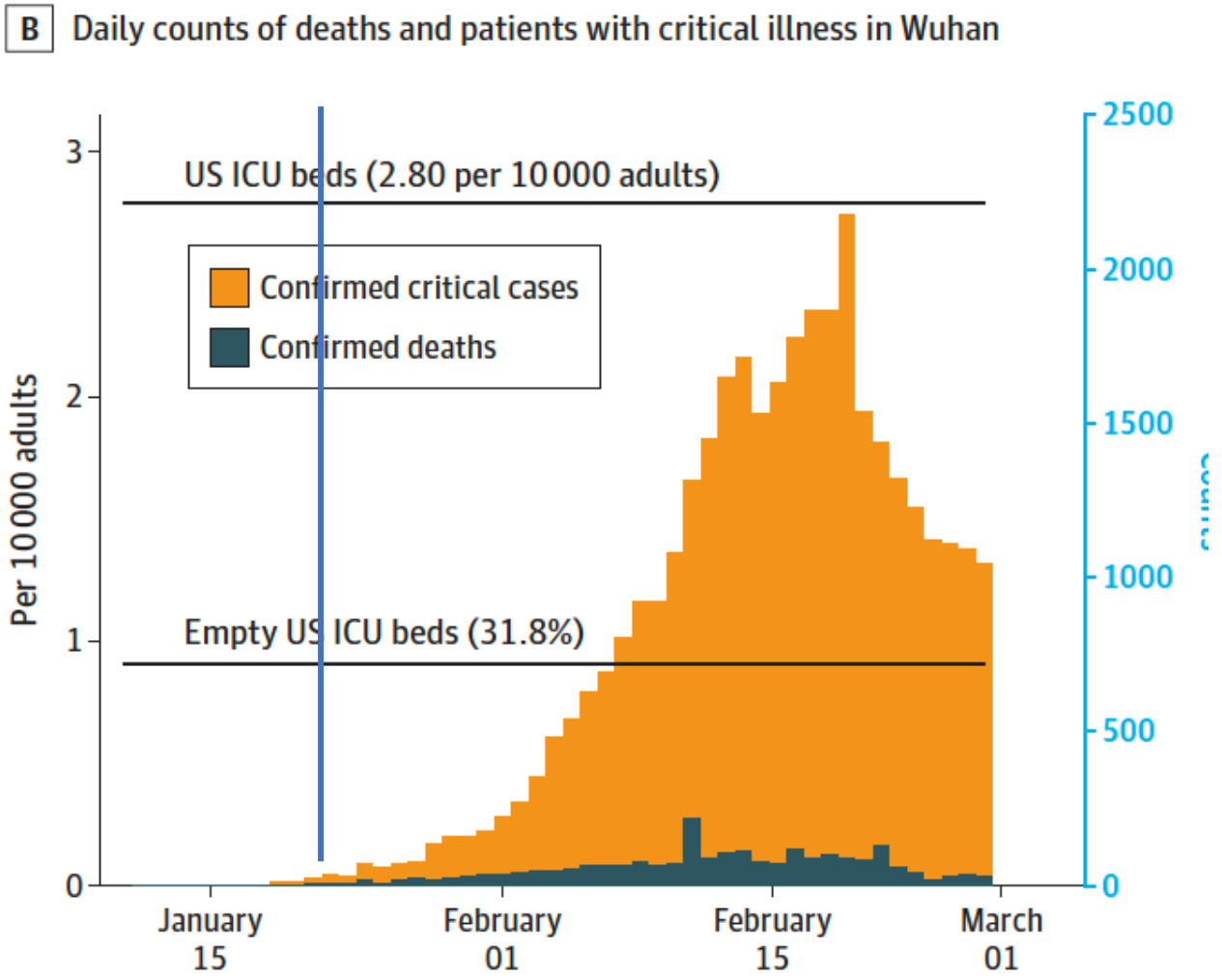


Learning about natural history



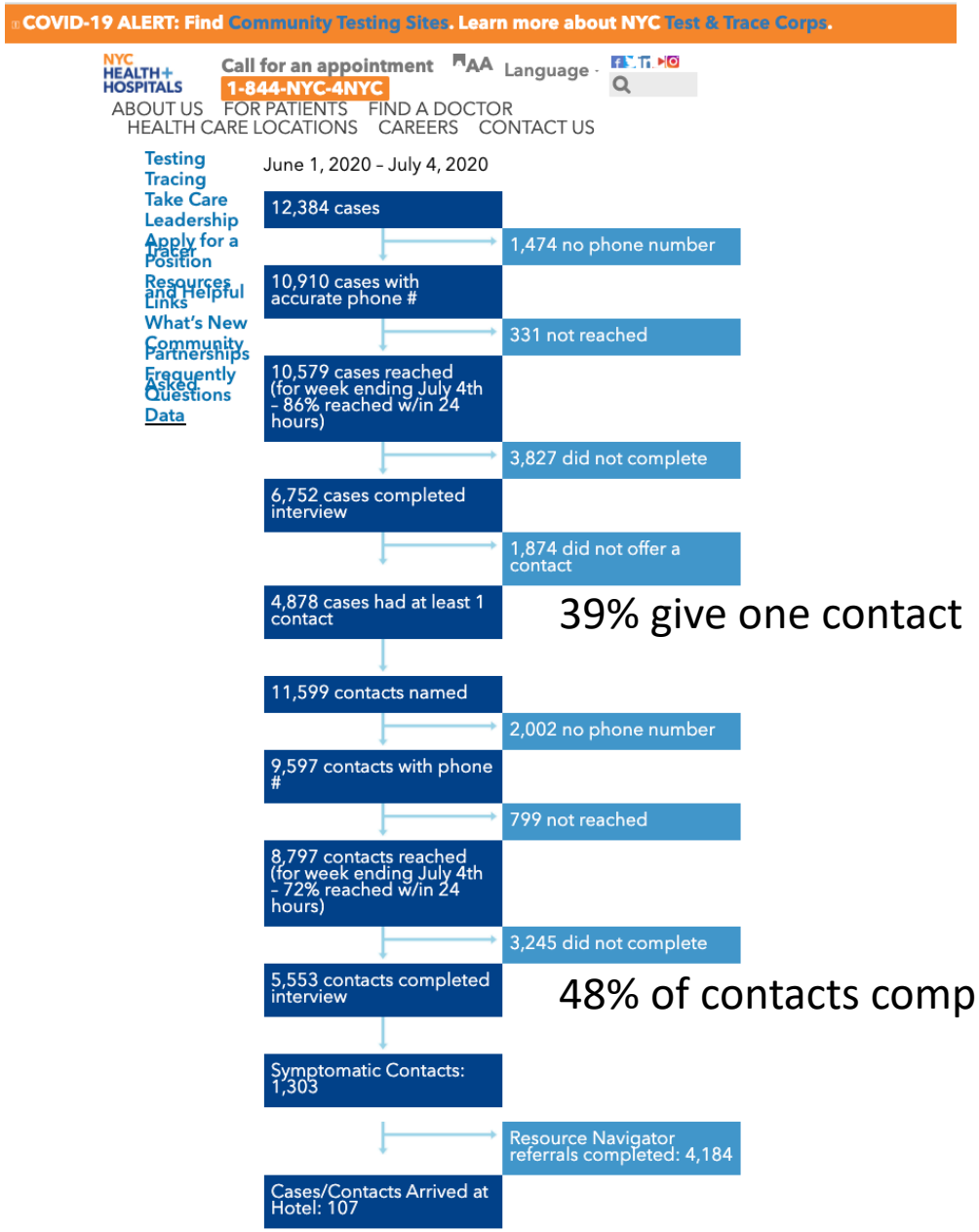
Pandemic Data analysis is all about (unmeasured, changing) delays

Consequences for control



R Li et al. JAMA Network Open 2020

Consequences for contact tracing



39% give one contact

48% of contacts complete interview

48%*39%<20% is upper bound of effectiveness before accounting for

- Delay from index symptoms to testing (up to weeks!)
- Delay from index testing to result
- Delay from result to isolation and tracing

NB prime viral shedding is before symptoms to 3-5 days after onset.

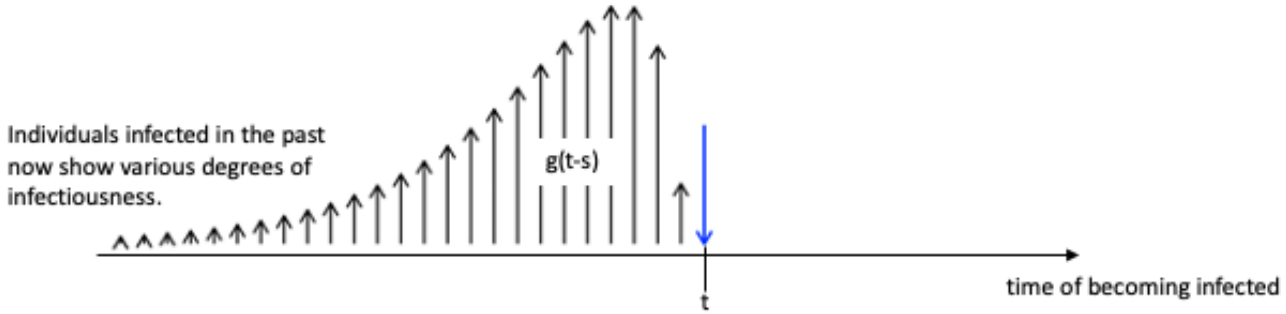
Contact tracing in a raging epidemic

Methods for reproduction number

Cori Method

R_t is the average number of new infections caused at time *t*, **by a person already infectious at time *t*.**

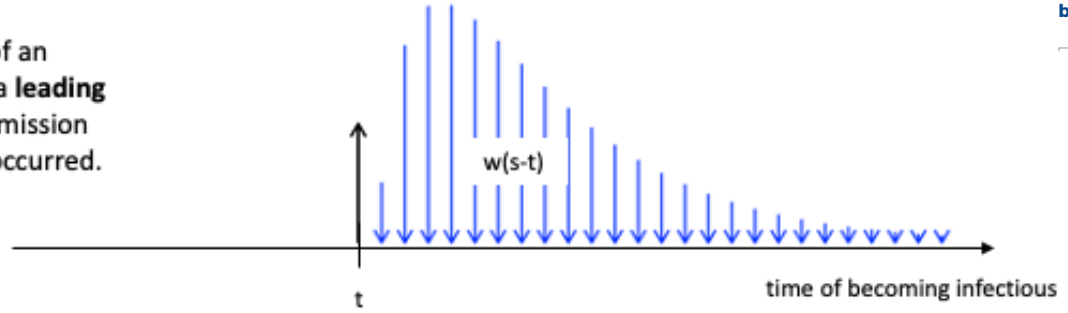
→ R_t reflects transmission happening at time t.



Wallinga and Teunis Method

R_t is the average number of new infections caused (eventually) **by a person who becomes infectious at time *t*.**

→ From the perspective of an observer at time *t*, this is a **leading** estimate. It predicts transmission events that have not yet occurred.



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Practical considerations for measuring the effective reproductive number, Rt

Posted June 23, 2020.

Katelyn M Gostic, Lauren McGough, Edward Baskerville, Sam Abbott, Keya Joshi, Christine Tedijanto, Rebecca Kahn, Rene Niehus, James A Hay, Pablo M. De Salazar, Joel Hellewell, Sophie Meakin, James Munday, Nikos Bosse, Katharine Sherratt, Robin M Thompson, Laura F White, Jana Huisman, Jérémie Scire, Sebastian Bonhoeffer, Tanja Stadler, Jacco Wallinga, Sebastian Funk, Marc Lipsitch, Sarah Cobey

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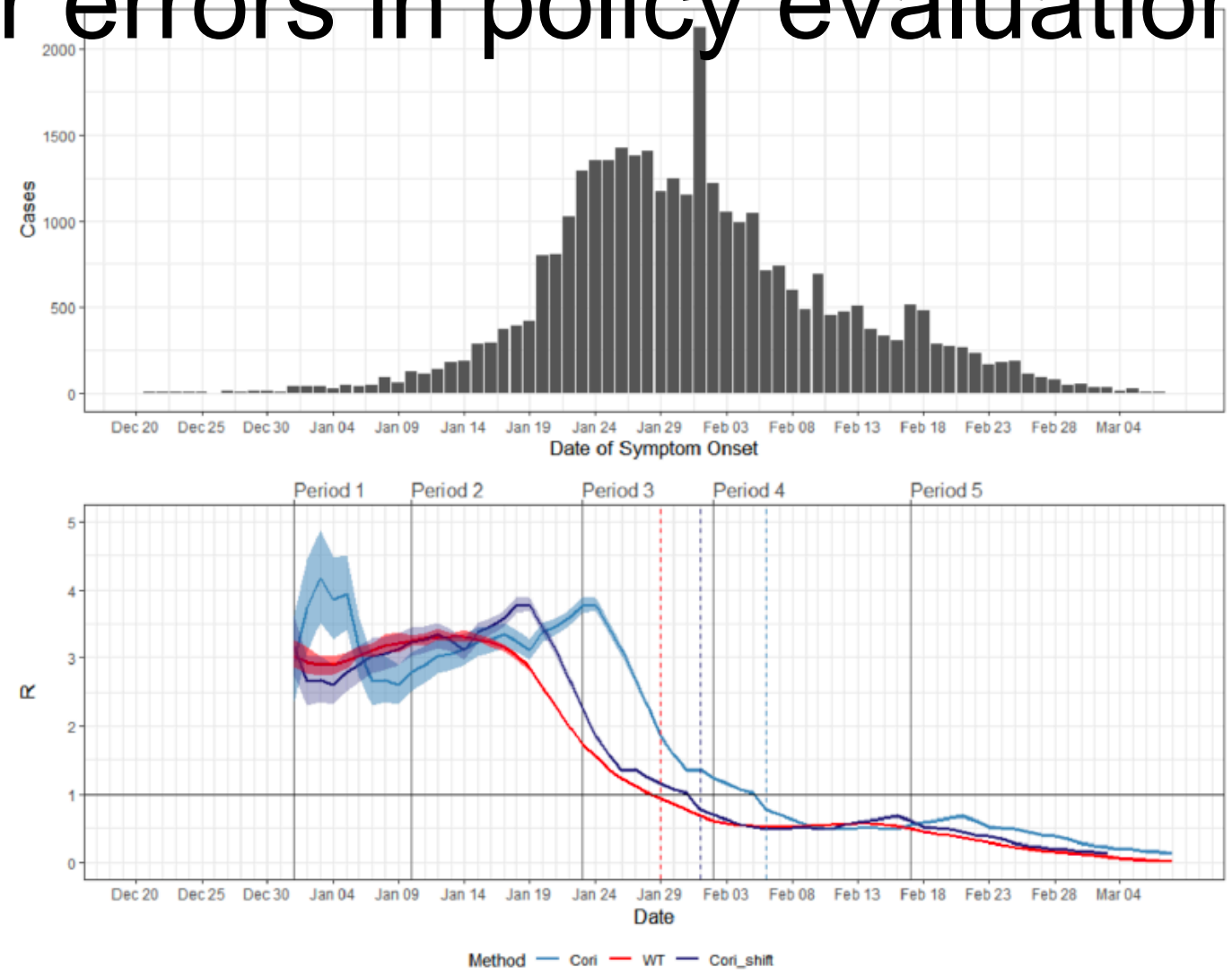
doi: https://doi.org/10.1101/2020.06.18.20134858

This article is a preprint and has not been peer-reviewed [what does this mean?]. It reports new medical research that has yet to be evaluated and so should *not* be used to guide clinical practice.

COVID-19 SARS-CoV-2 preprints from medRxiv and bioRxiv

Subtle methodologic choices can lead to major errors in policy evaluation



K Joshi, S Cobey, M Lipsitch

Comment on data from Pan et al. JAMA 2020

The New York Times

Opinion

The United States Needs a 'Smart Quarantine' to Stop the Virus Spread Within Families

Evidence from around the world shows that stay-at-home orders take us only so far.

By Harvey V. Fineberg, Jim Yong Kim and Jordan Shlain

Dr. Fineberg, Dr. Kim and Dr. Shlain specialize in public health.