Generation intervals in space: understanding the effects of spatial and network structure on links between generation interval and growth rate

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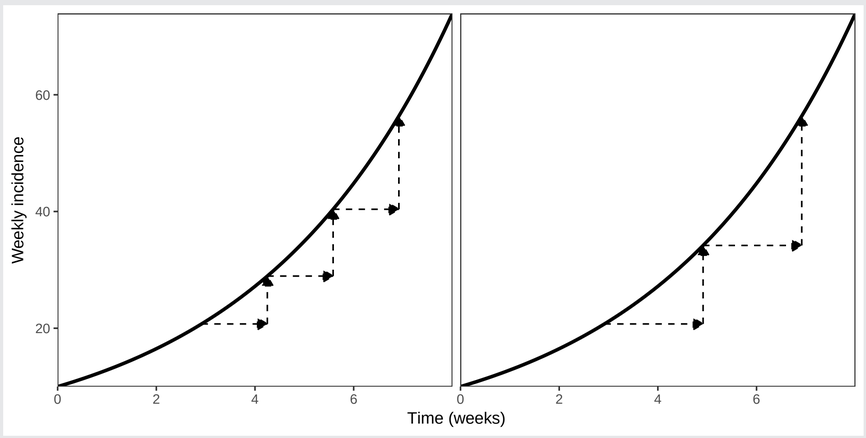
Introduction

- Generation interval (GI) measures time between when a person is infected and when that person infects another person
- GI distributions, $g(\tau)$, link speed, r, and strength, $\mathcal{R}$, of an epidemic

$$1/\mathcal{R} = \int g(\tau)\exp(-r\tau)d\tau$$

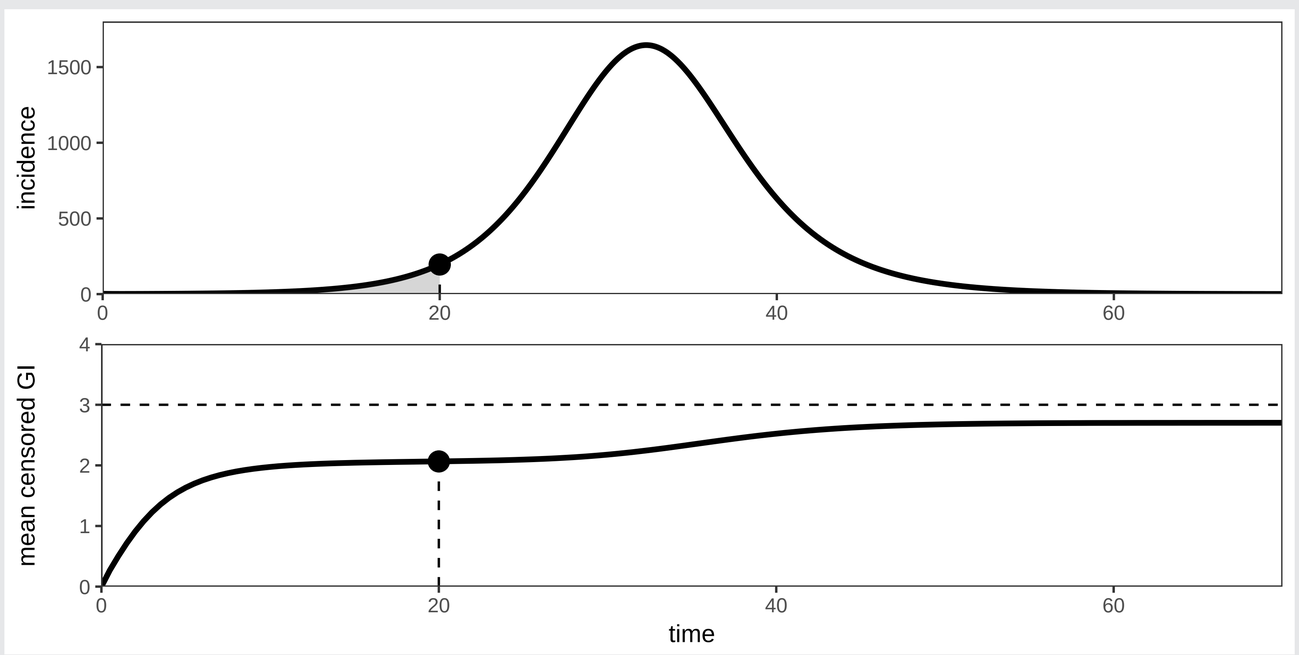
- Previous work [**?**] showed that measuring GI through contact tracing data introduces bias
- Network structure can affect GI distributions ([TRAPMAN] considered changes in $\mathcal{R}$)

Linking r and $\mathcal{R}$

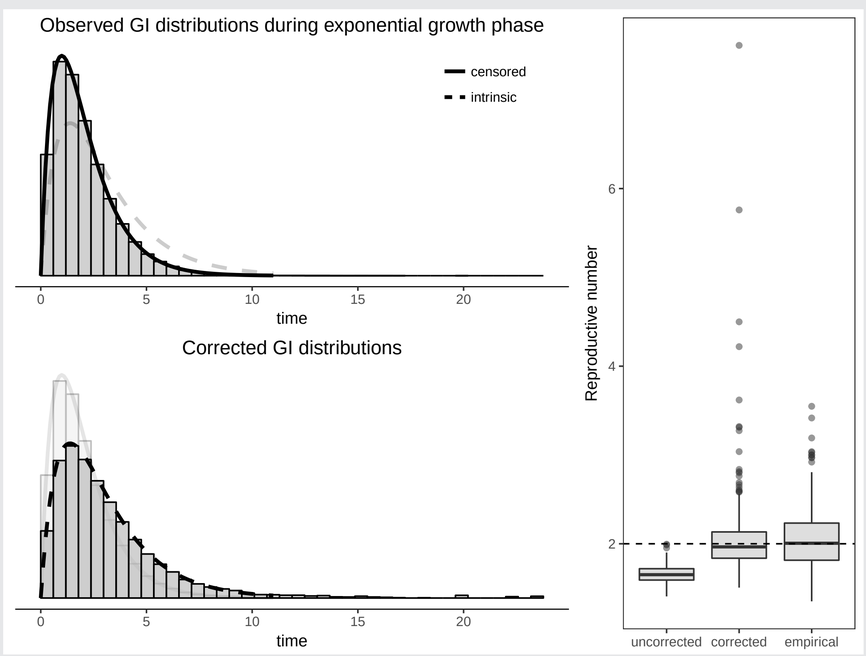


Longer generation interval requires higher $\mathcal{R}$ given fixed exponential growth rate r.

Realized generation interval through time



Correcting GI distributions



Result of 500 stochastic simulations using SEIR model.

- During the exponential growth phase, the observed GI distributions is proportional to $g(\tau)\exp(-r\tau)$.
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Spatial/network effect

Fill

https://github.com/parksw3/networkSEIR/