

Uncertainty visualization in the wild: COVID-19

SIADS 542: Presenting uncertainty – Week 4, Lecture 1

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Roadmap

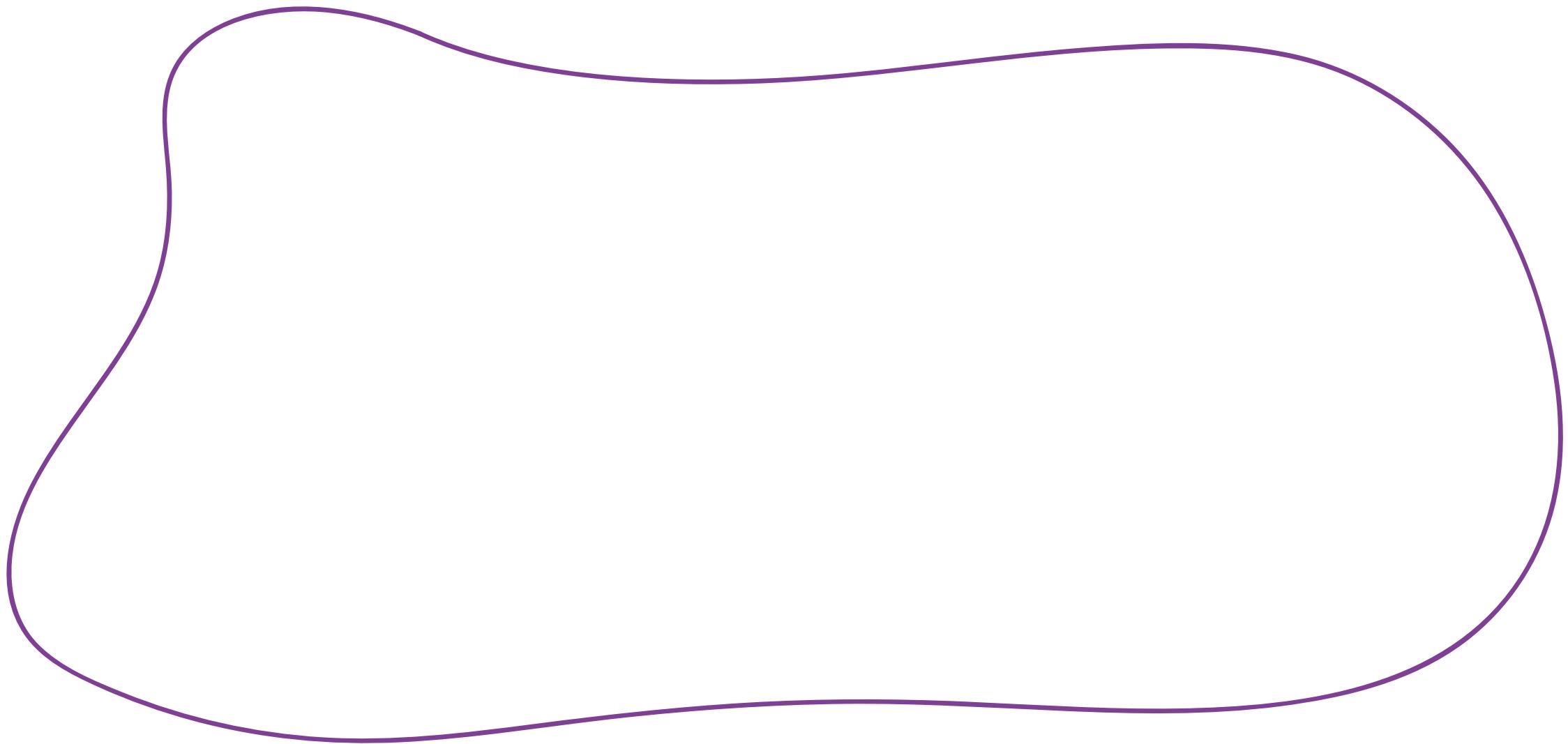
- Week 1: Introduction to uncertainty visualization
Types of uncertainty; **small** vs **large** world
- Week 2 & 3: **Small world uncertainty**
 - Continuous uncertainty encodings
 - Frequency-framing uncertainty encodings
- Week 4: **Large world uncertainty**

Today

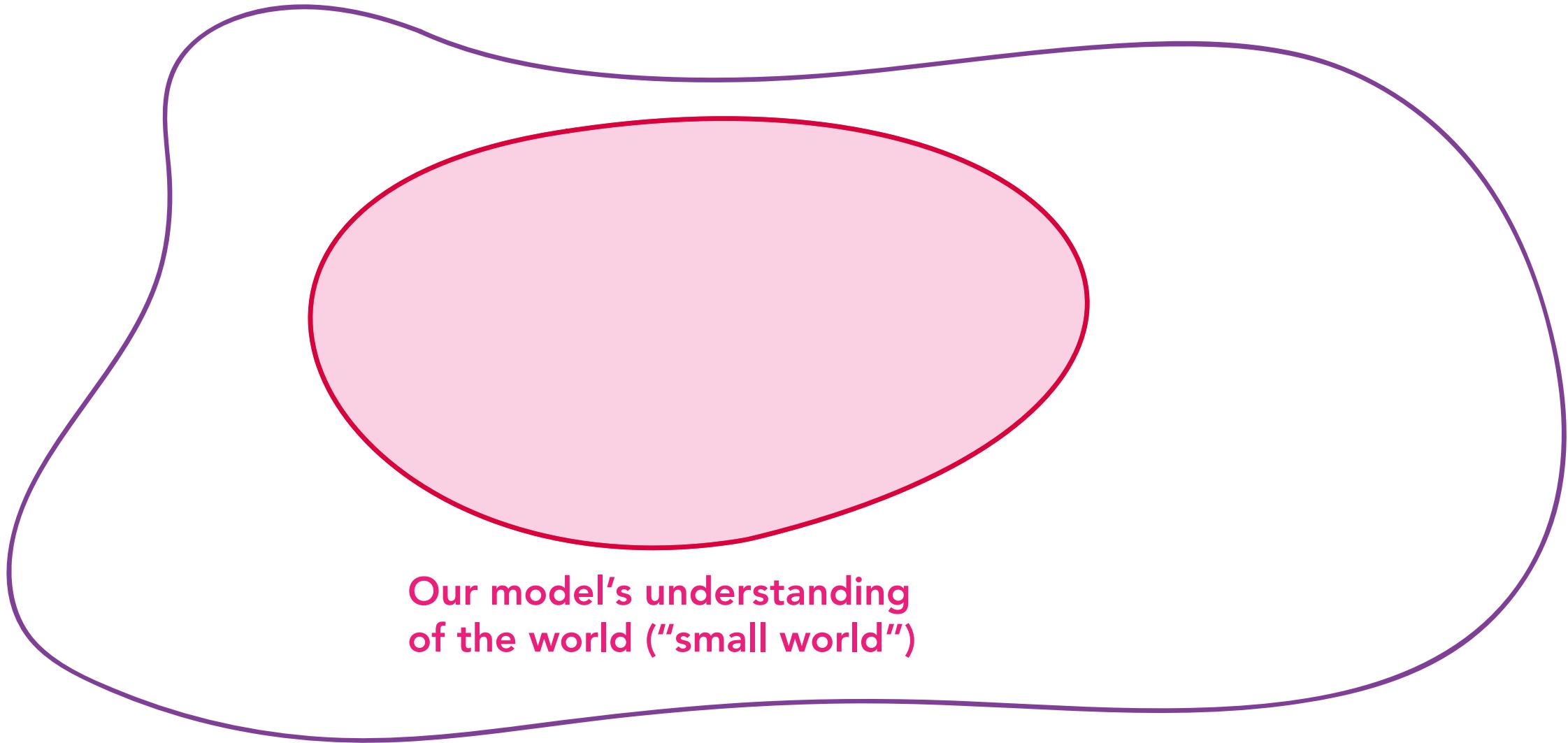
We'll talk about **large world** and **small world** uncertainty
in the context of the COVID-19 pandemic

Large world uncertainty: a reminder

Reality ("large world")

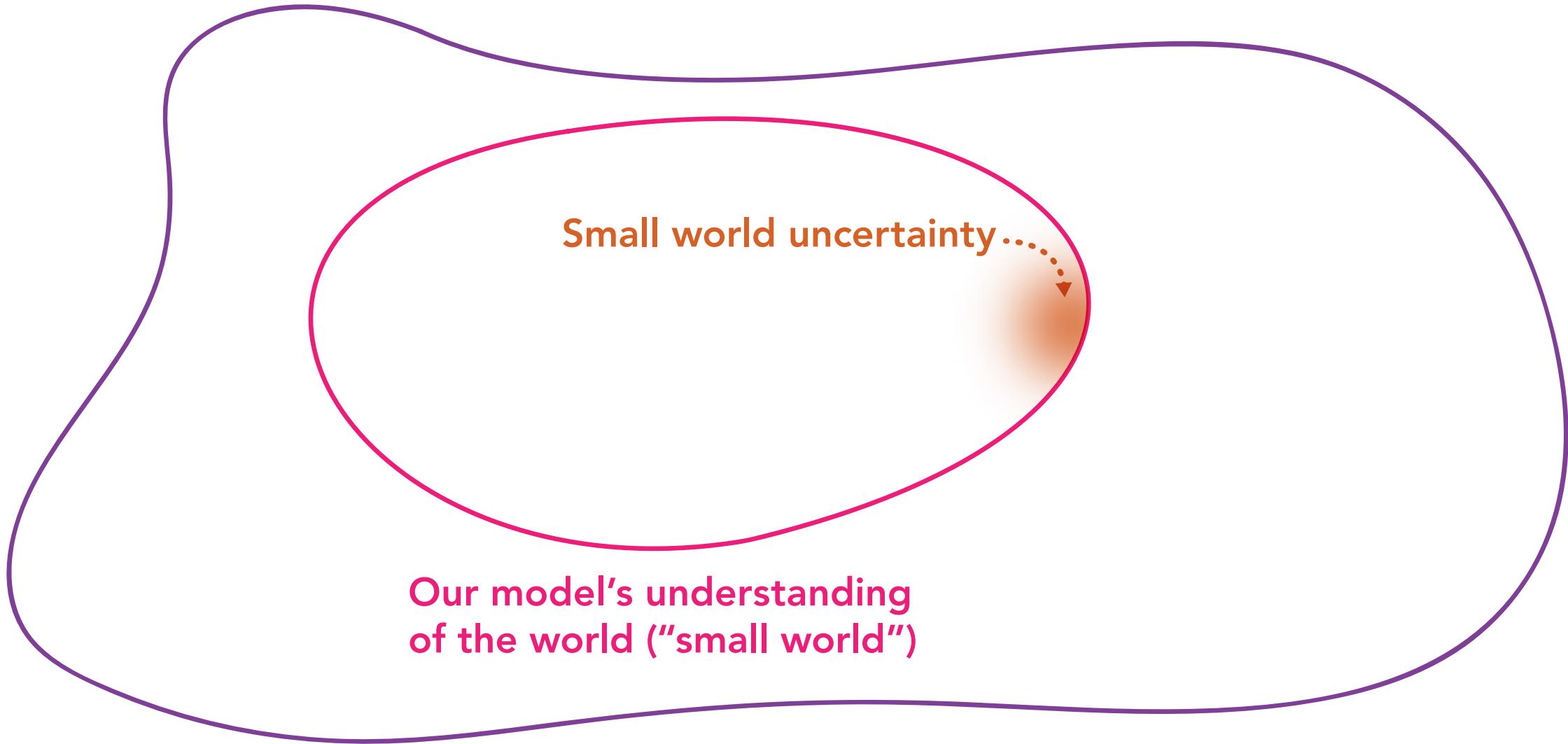


Reality ("large world")

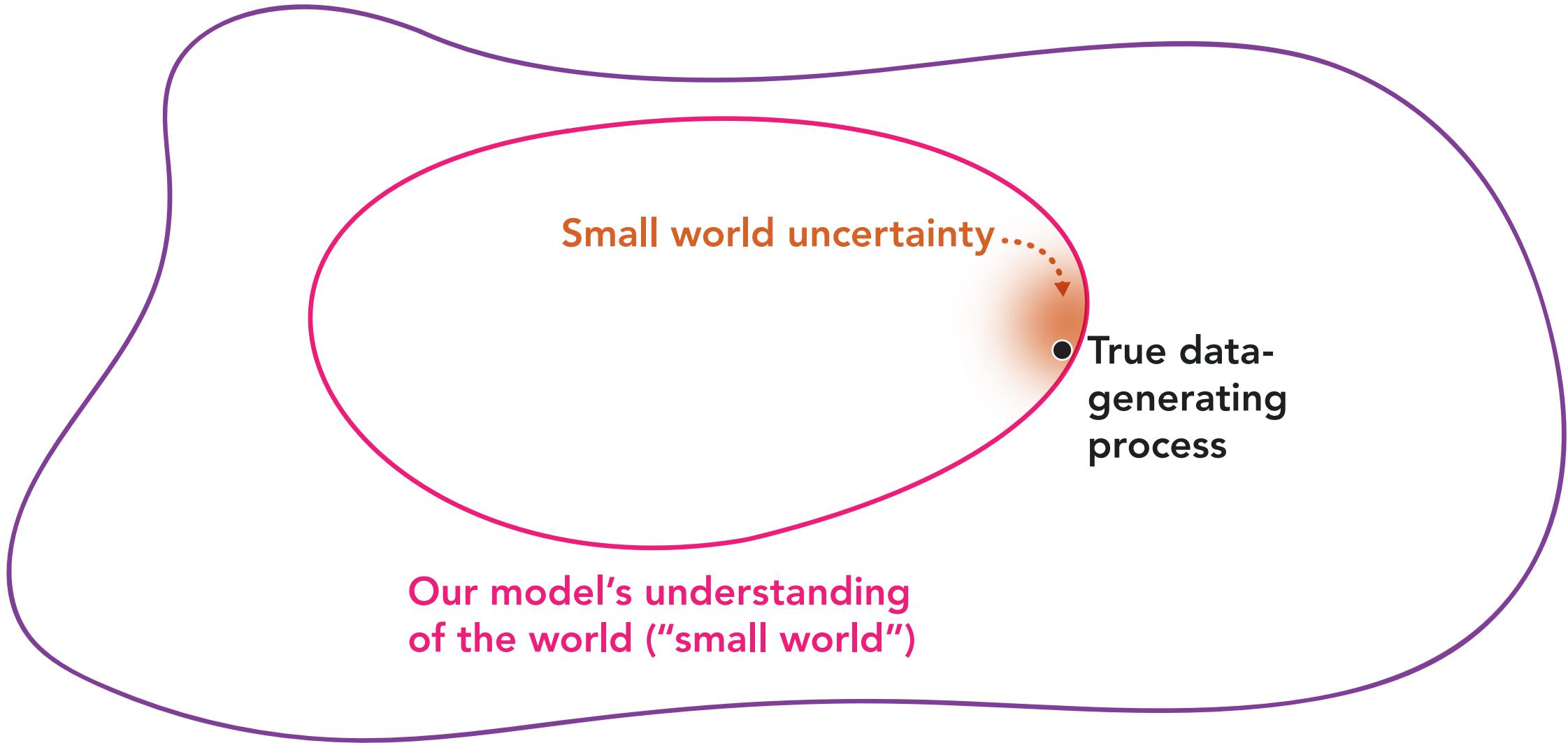


Our model's understanding
of the world ("small world")

Reality ("large world")



Reality ("large world")

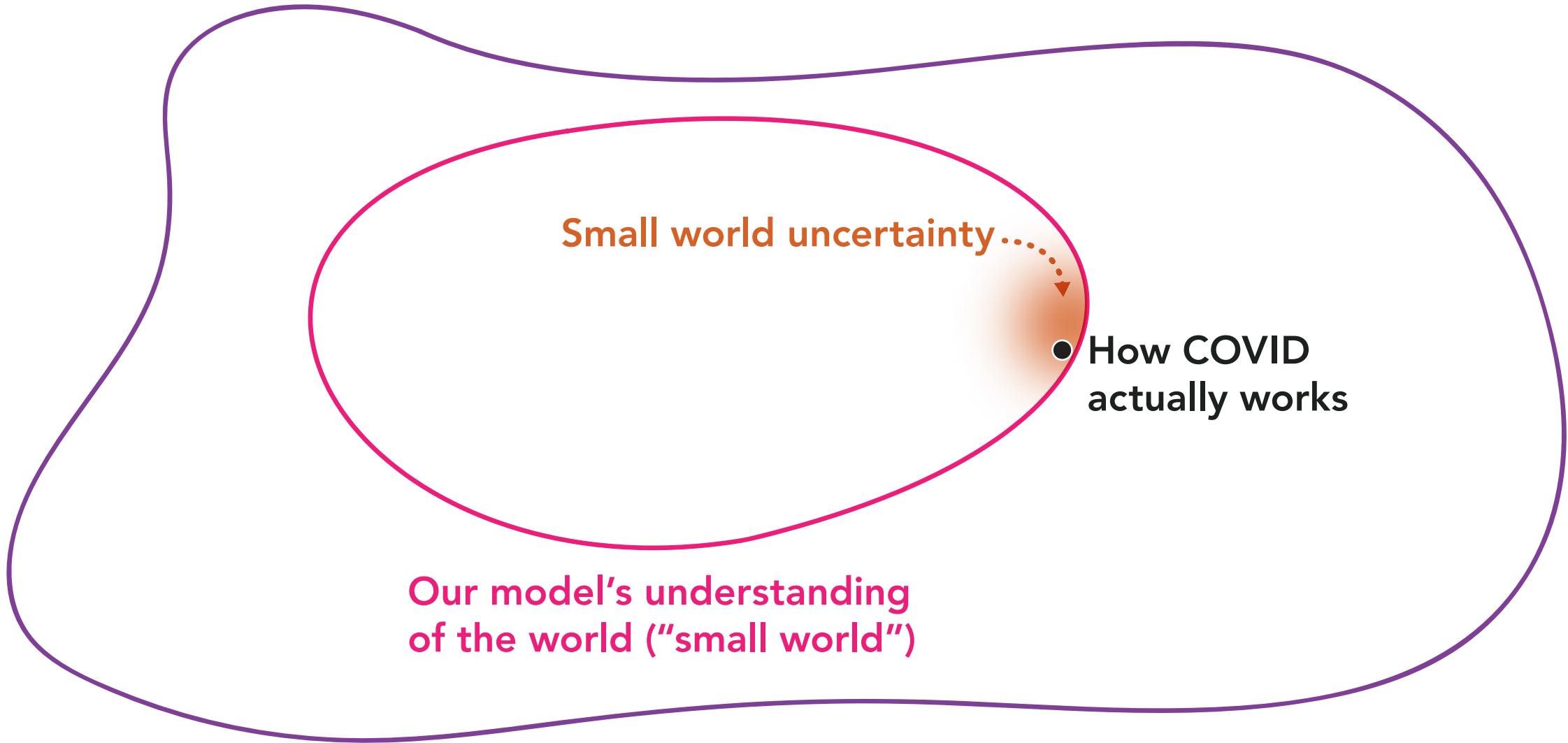


Our model's understanding
of the world ("small world")

• True data-
generating
process

Small world uncertainty

Reality ("large world")

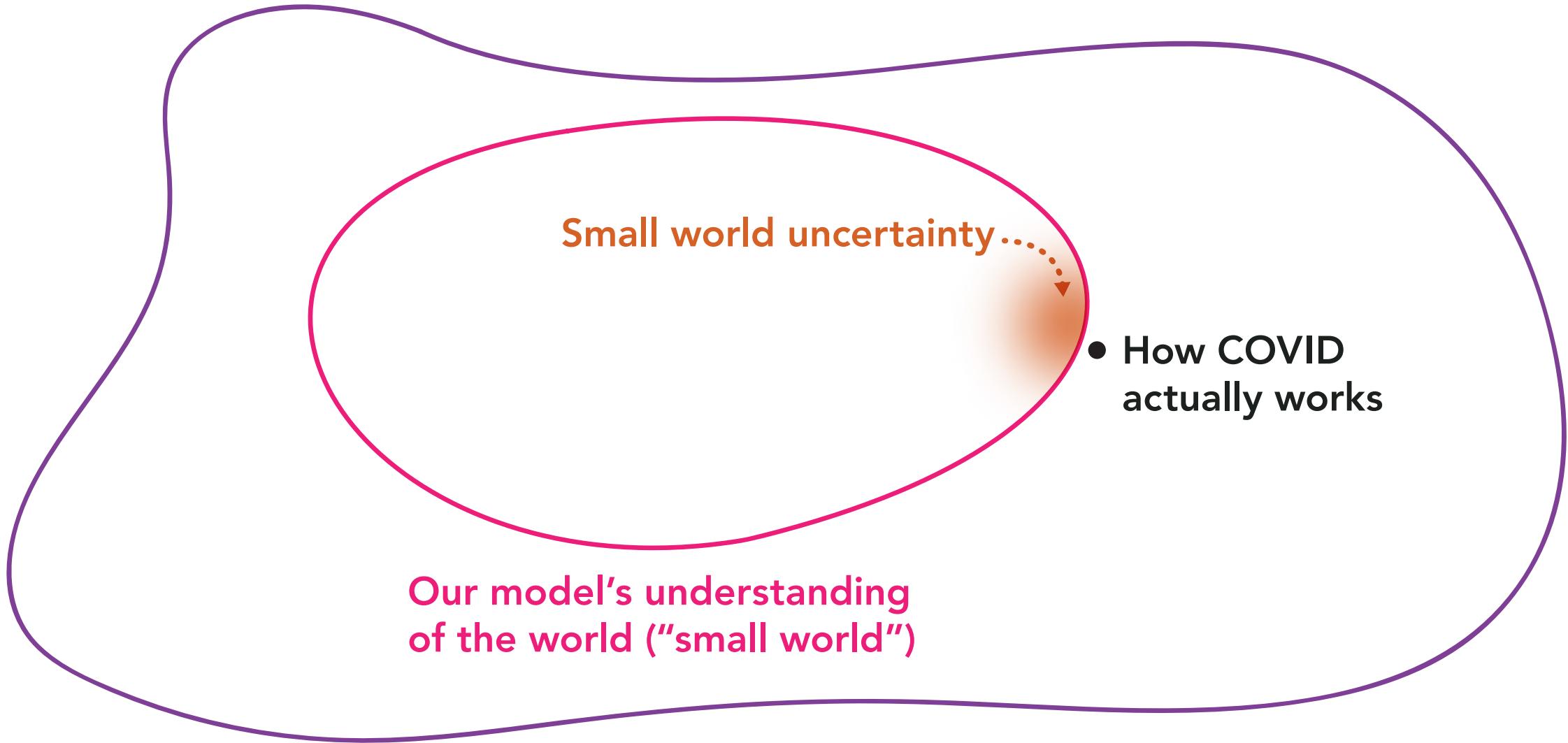


Our model's understanding
of the world ("small world")

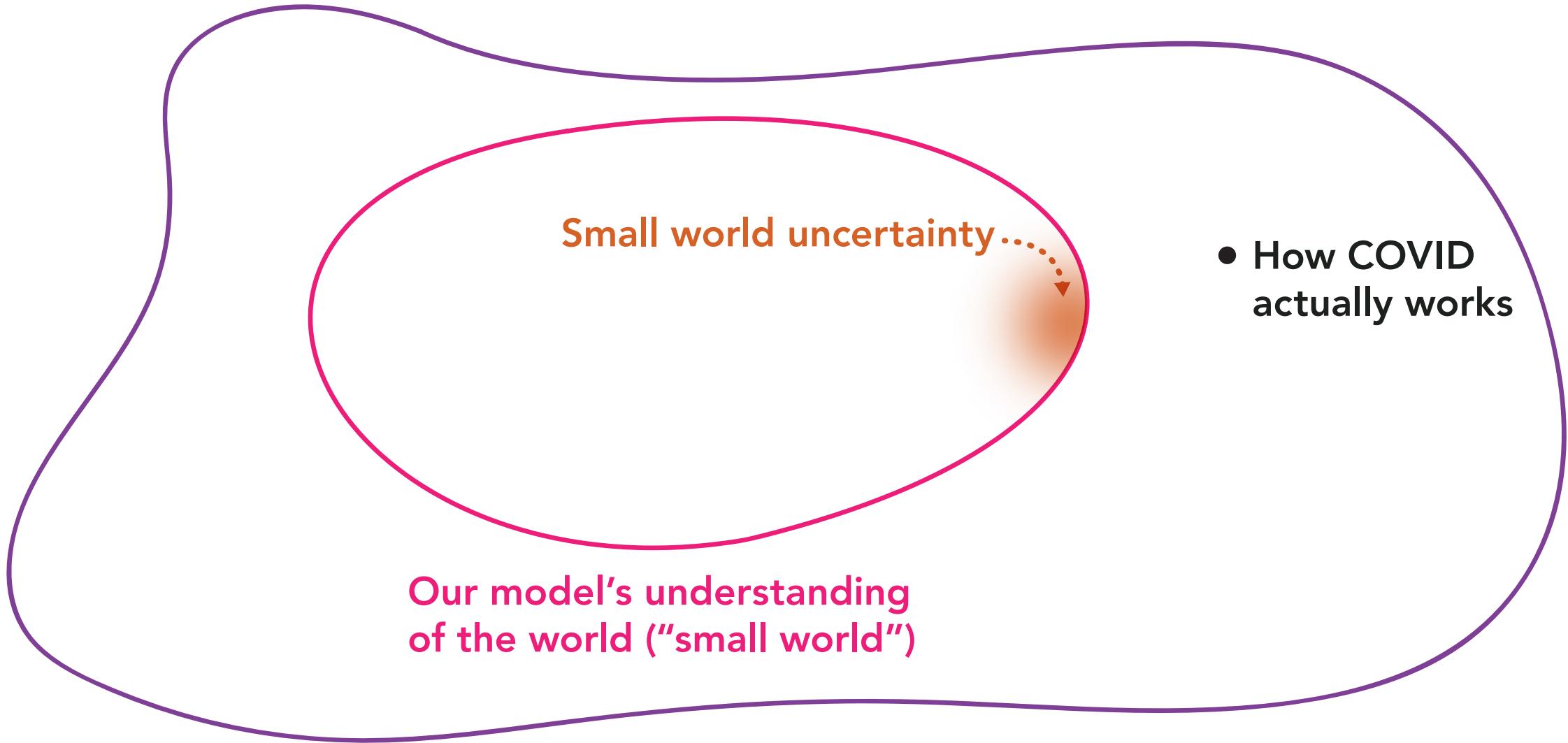
• How COVID
actually works

Small world uncertainty

Reality ("large world")



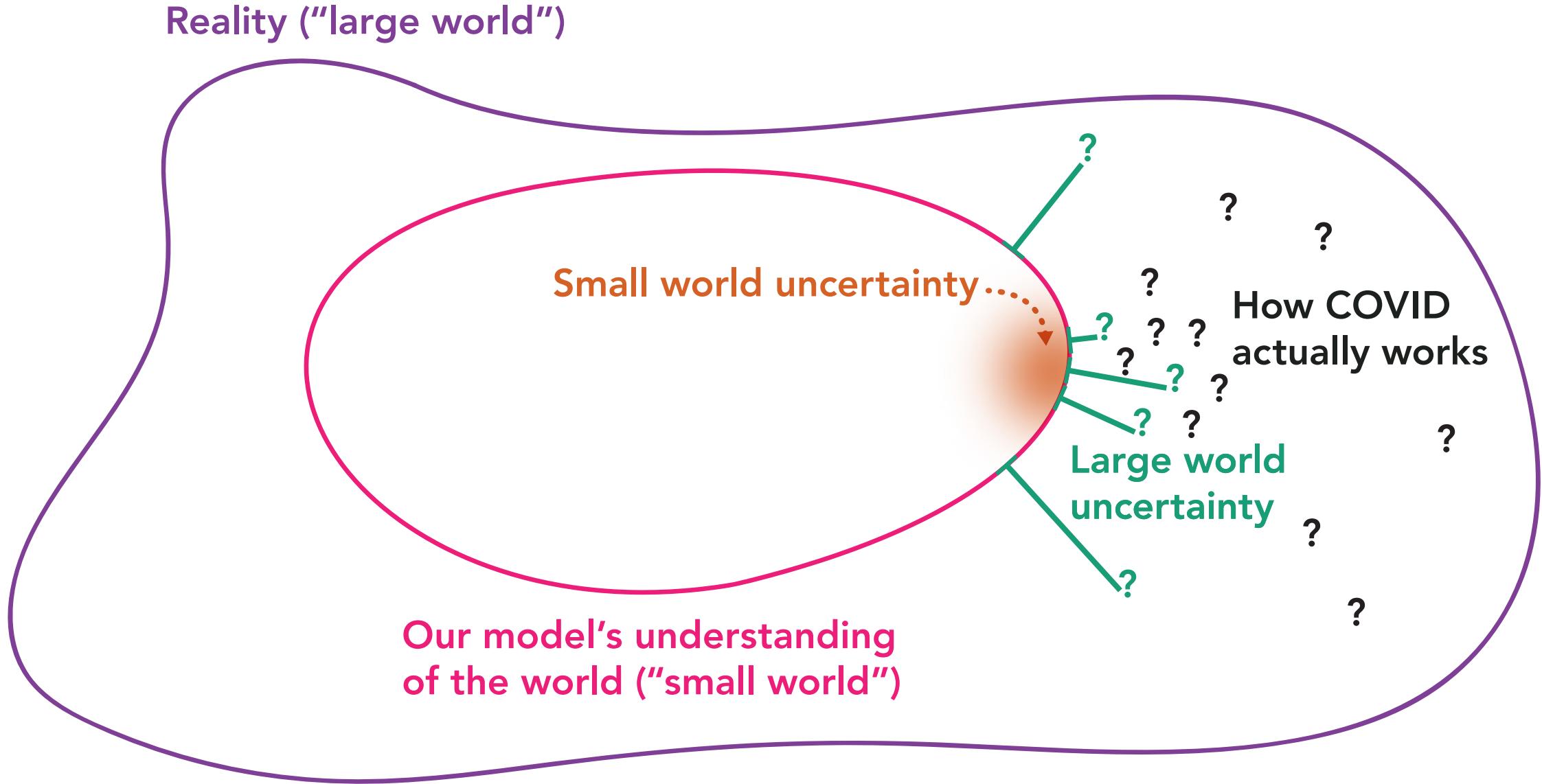
Reality ("large world")



Reality ("large world")

Small world uncertainty.

Our model's understanding of the world ("small world")



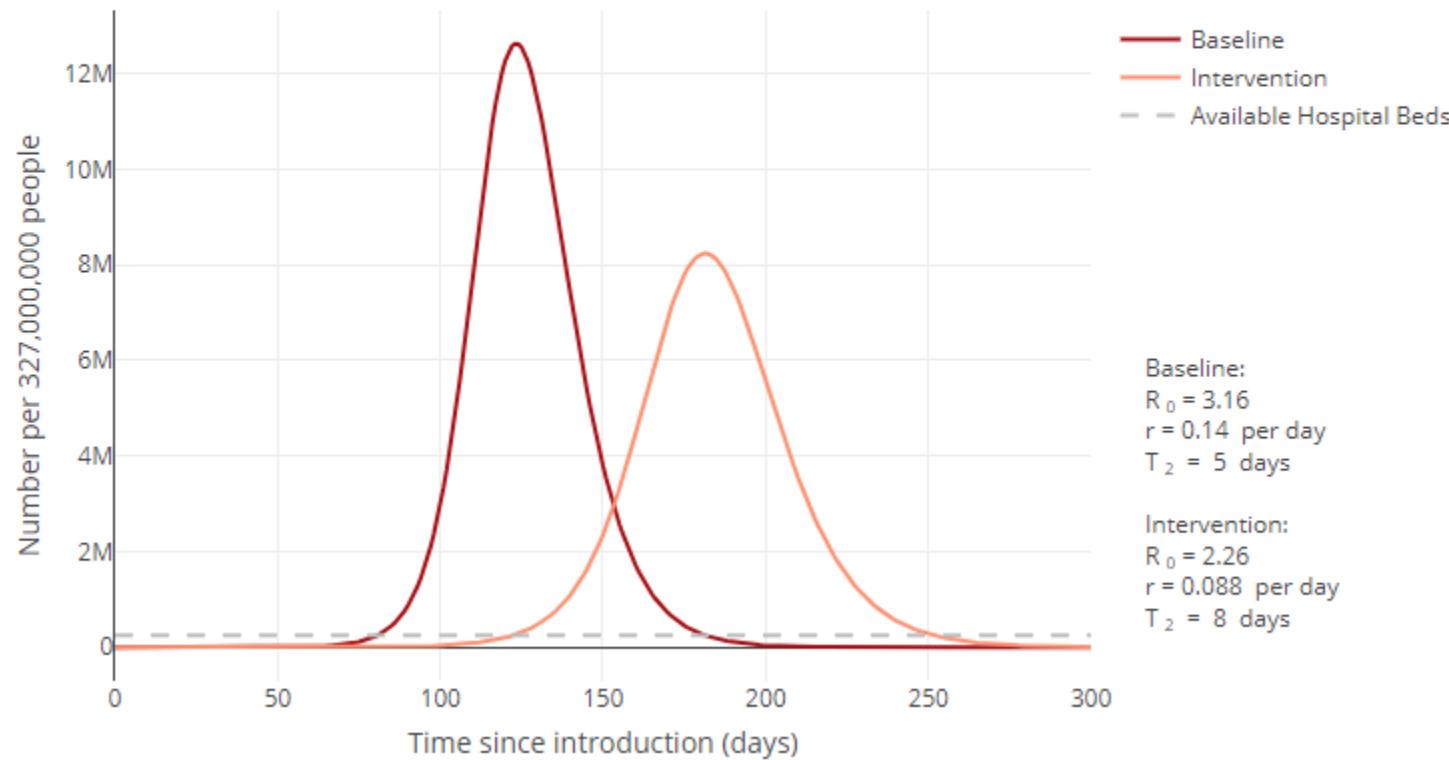
Large and small worlds in COVID visualizations

Large versus small world uncertainty

[Allison Hill, Harvard, <https://alhill.shinyapps.io/COVID19seir>]

COVID-19 Cases vs Healthcare Capacity

Simulate predicted COVID-19 cases vs the capacity of the healthcare system to care for them. The care required depends on disease severity - individuals with 'severe' infection require hospitalization and individuals with 'critical' infection often require ICU-level care and mechanical ventilation.

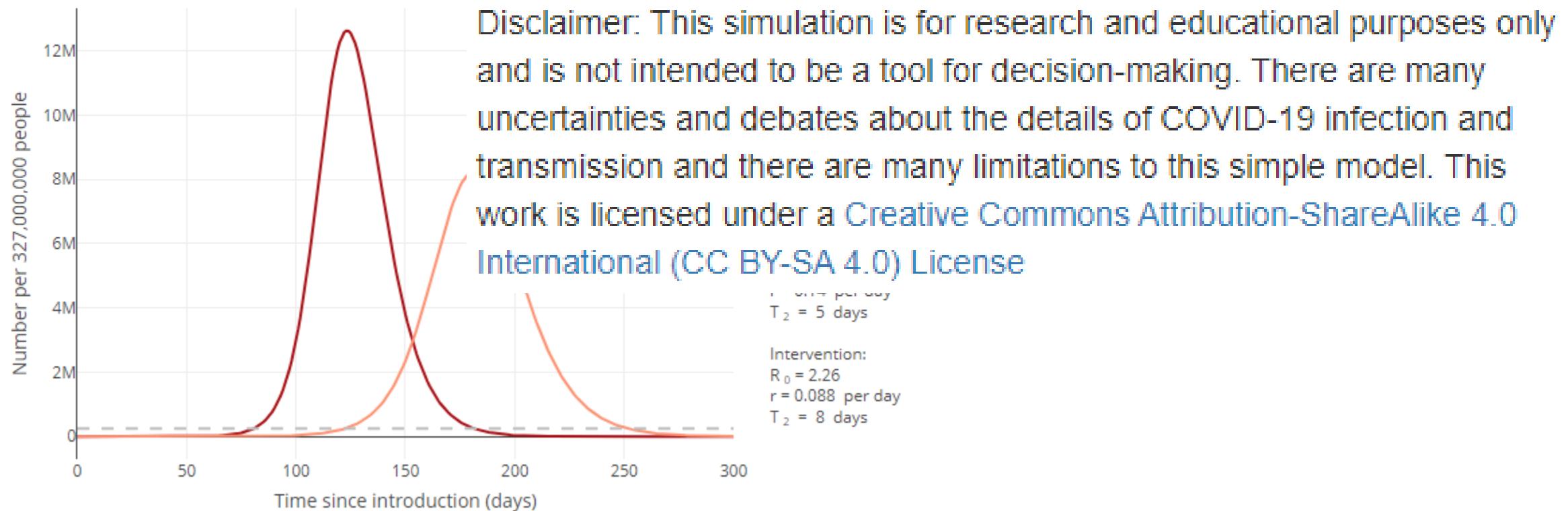


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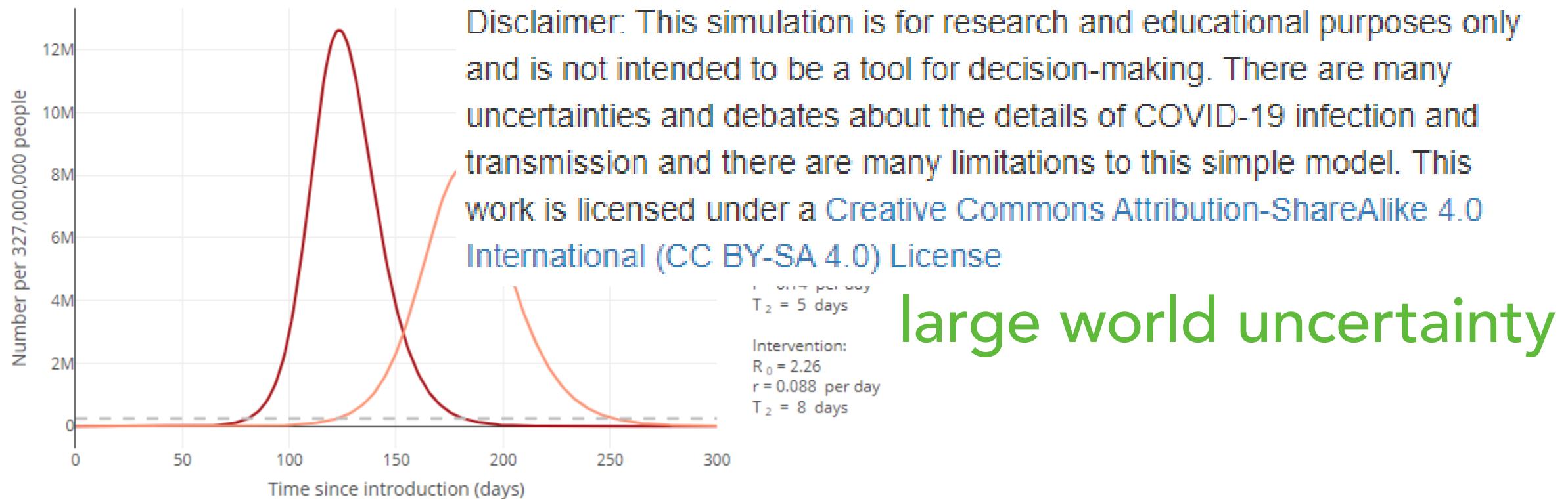


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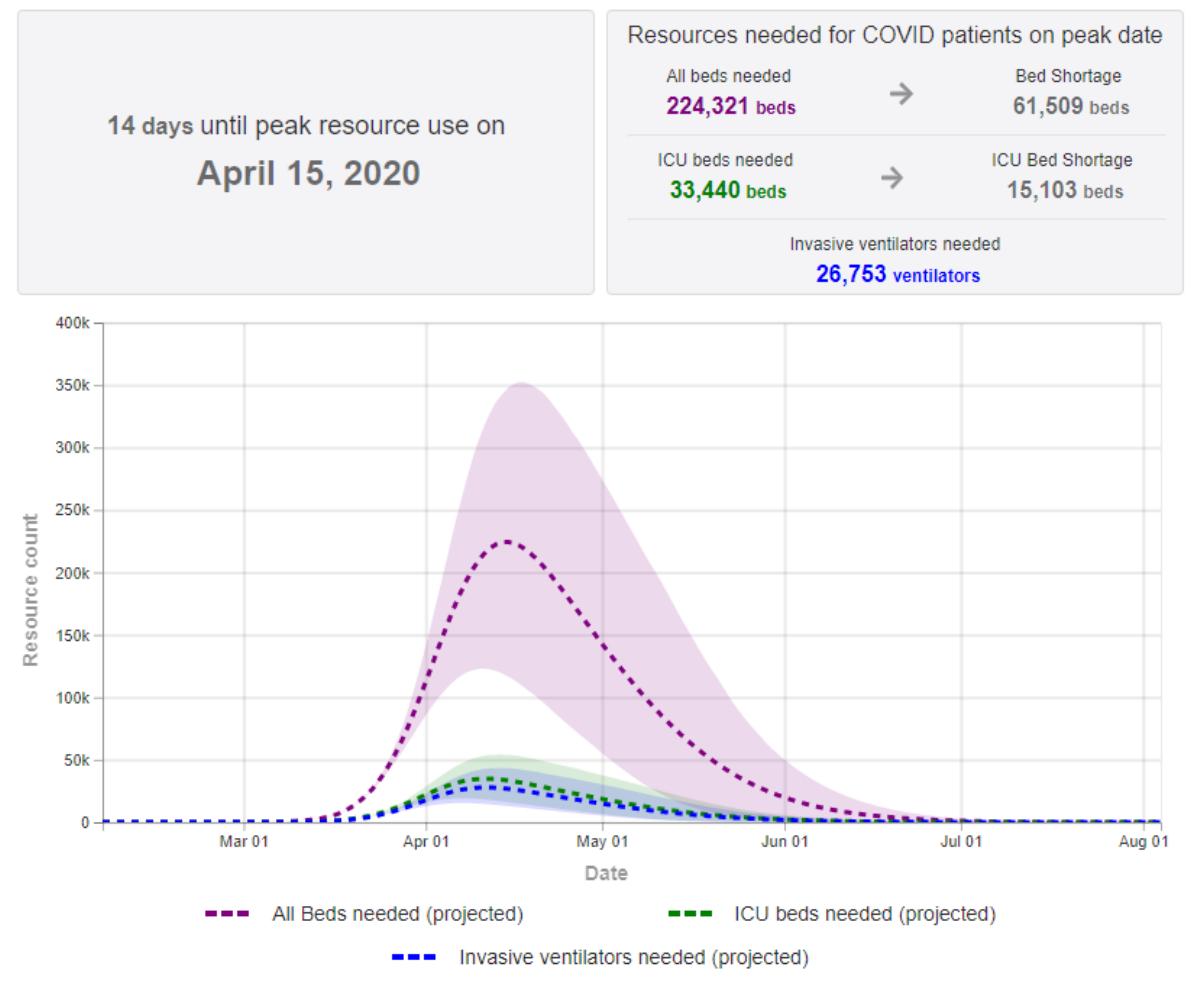
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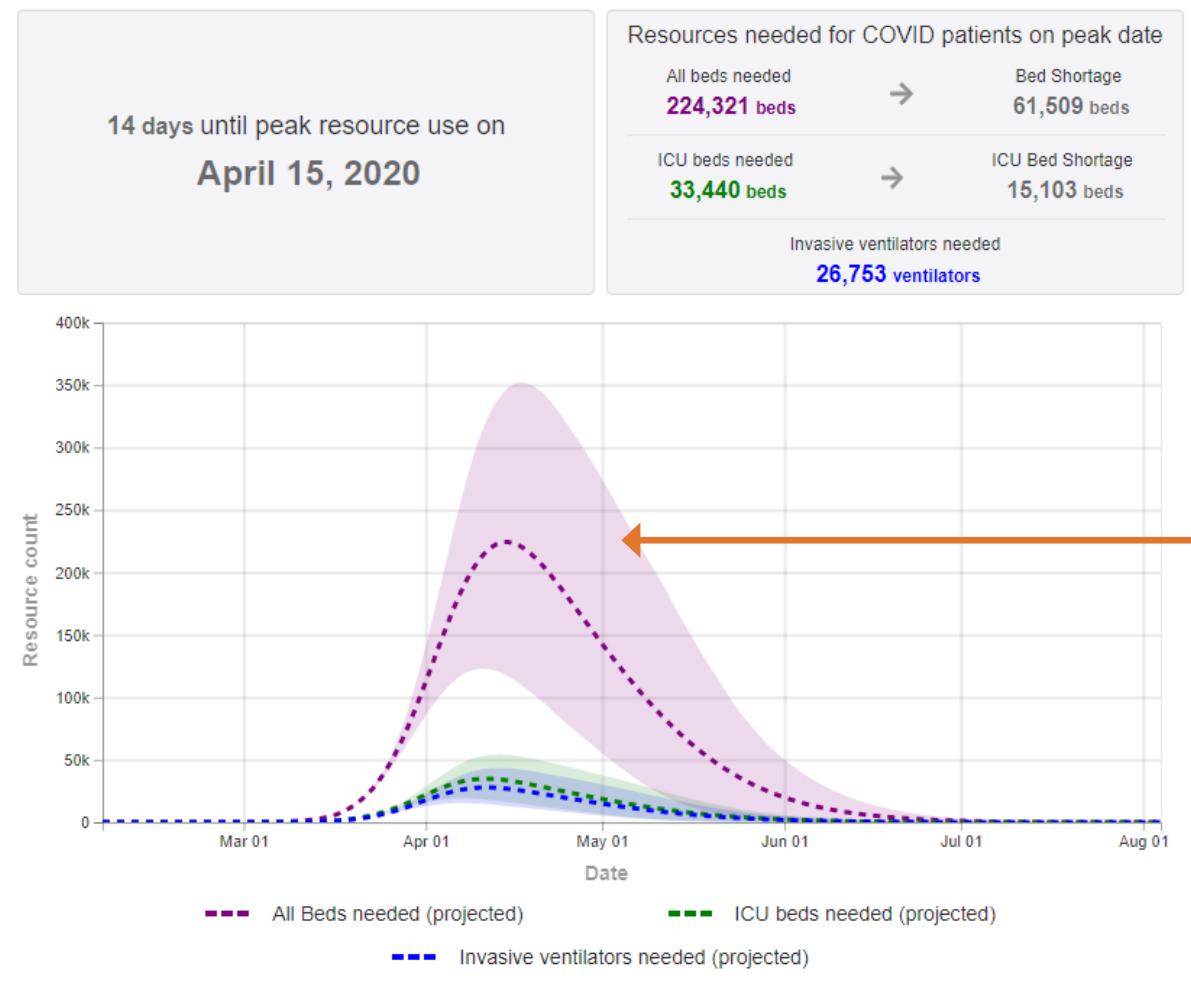
Large versus small world uncertainty

[IHME, <https://covid19.healthdata.org/projections>]



Large versus small world uncertainty

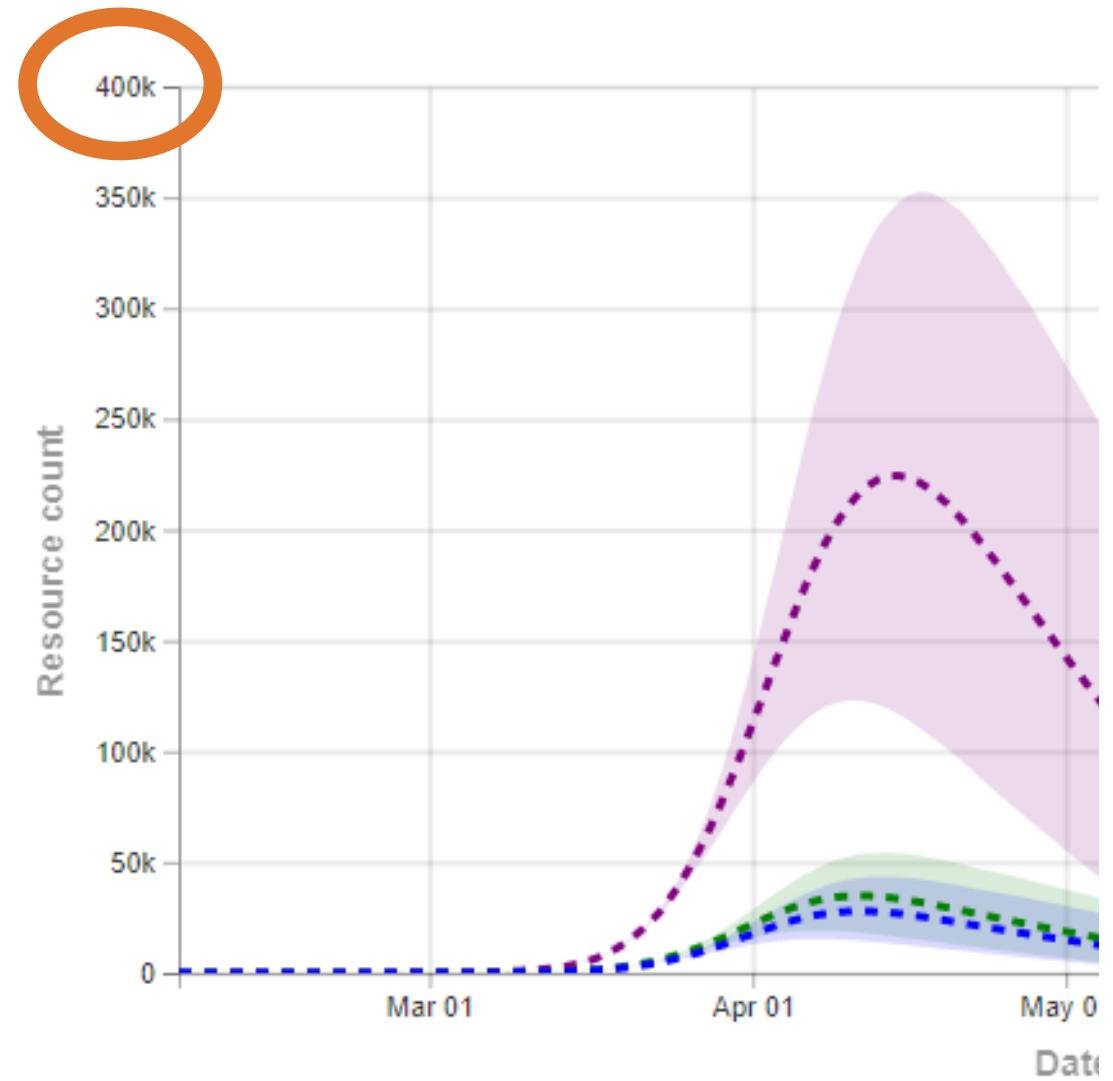
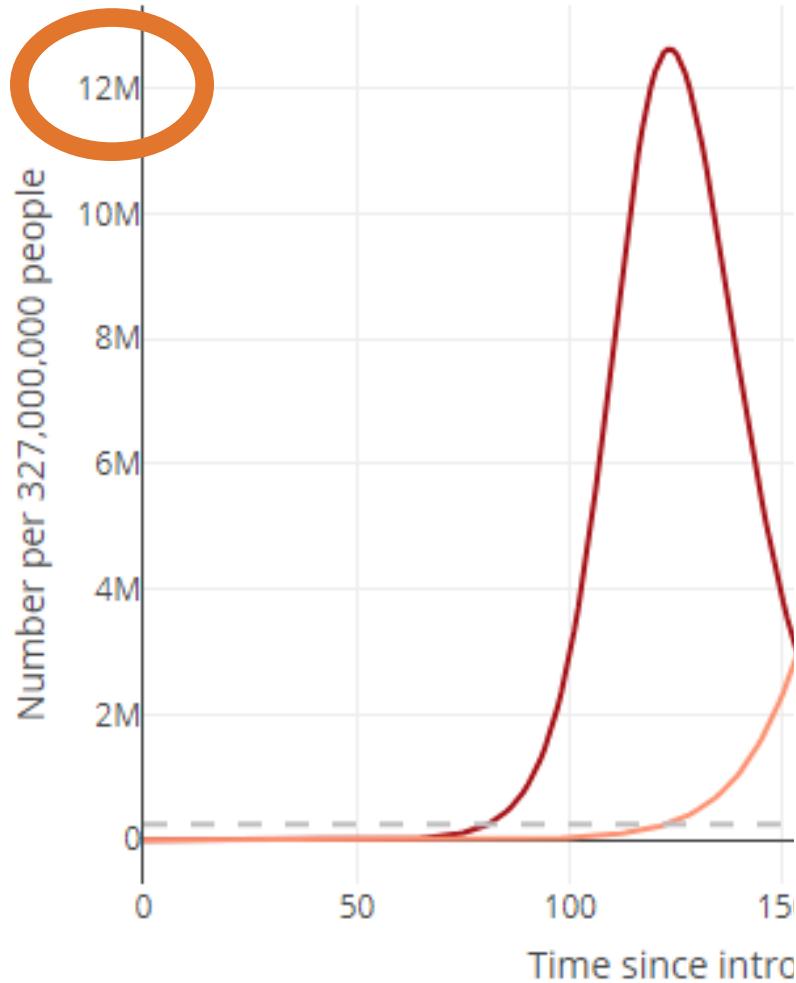
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small world uncertainty

Large versus small world uncertainty

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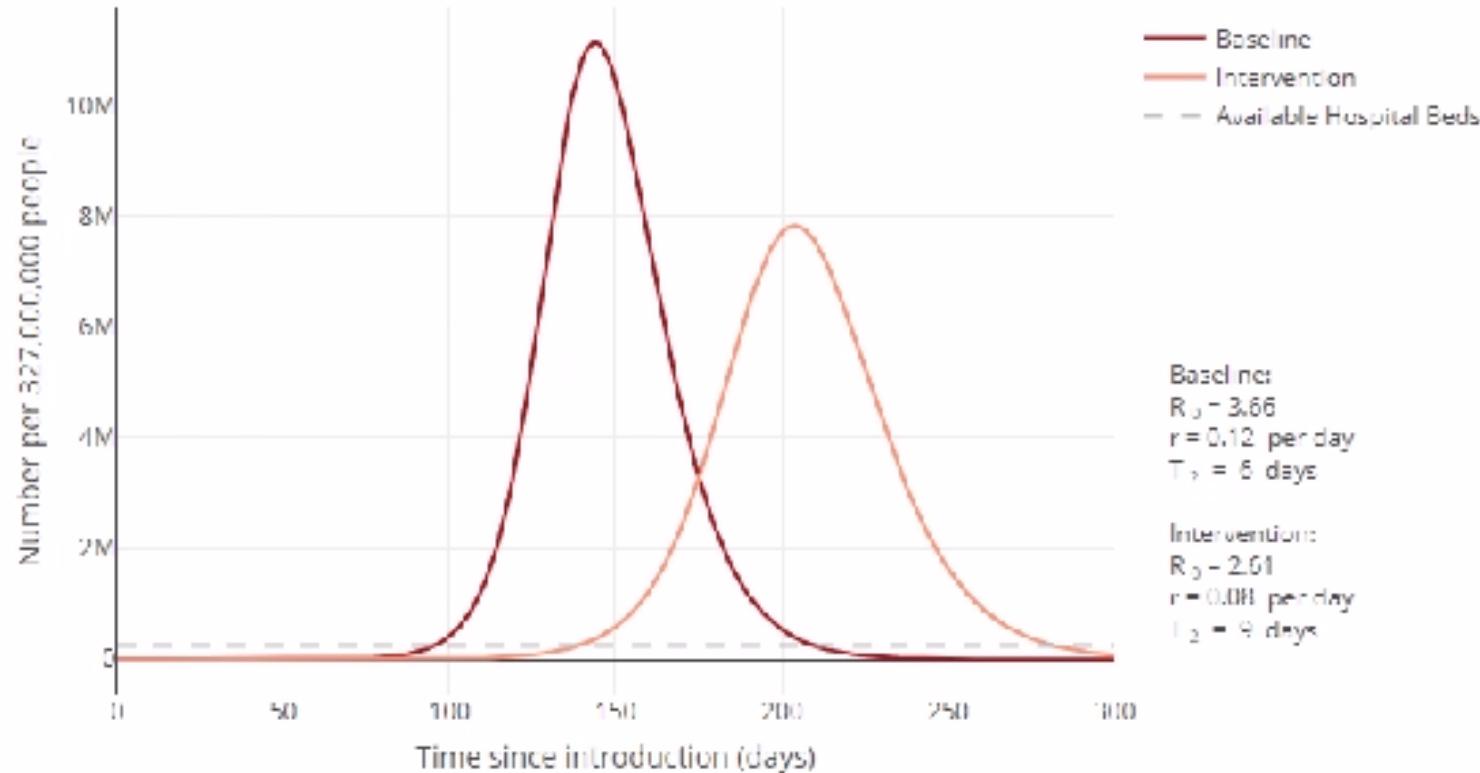


Small world uncertainty for COVID...

HOPs for the curve

COVID-19 Cases vs Healthcare Capacity

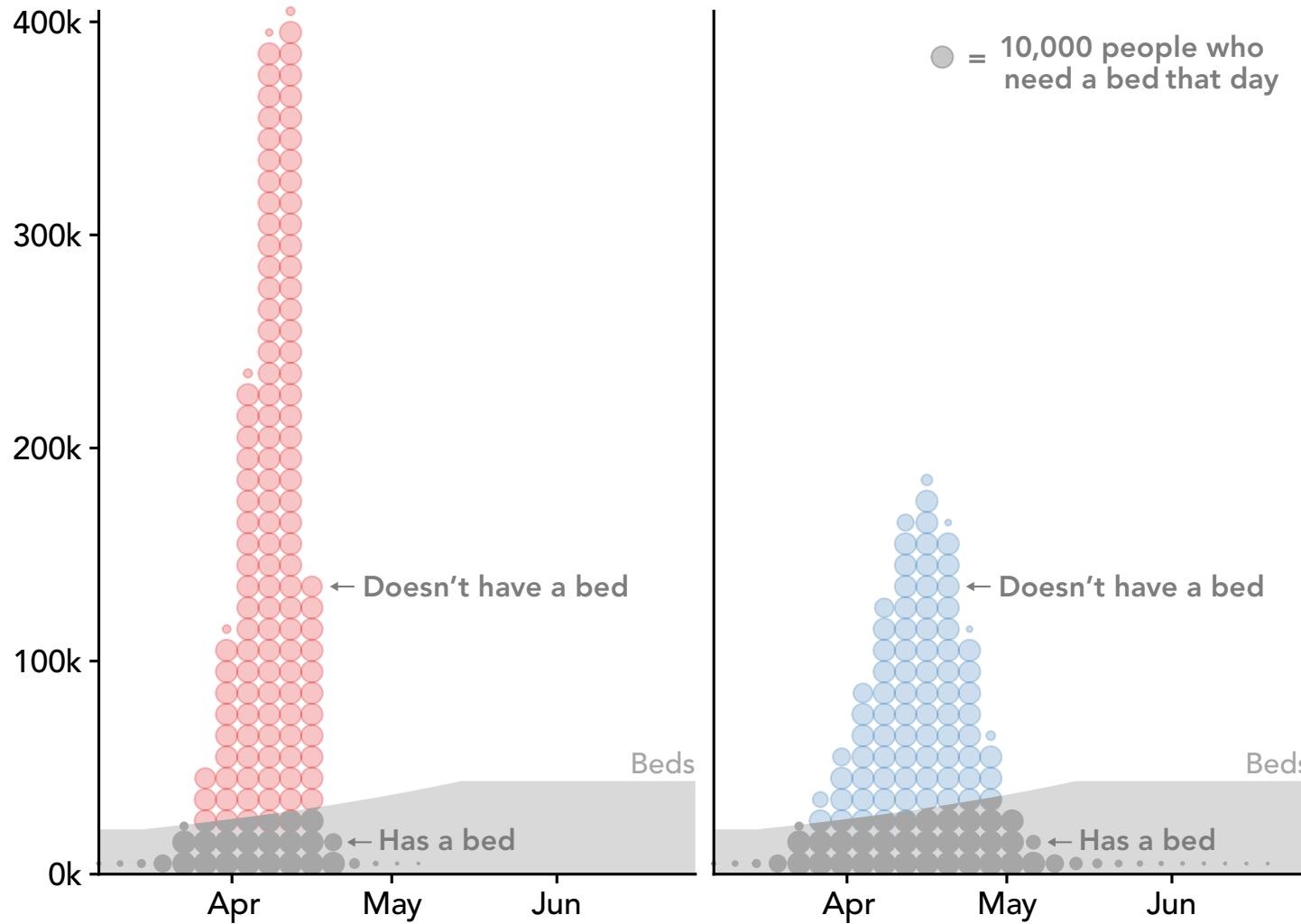
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People in the hospital at the same time...

When we **DO NOT** flatten the curve

When we **DO** flatten the curve

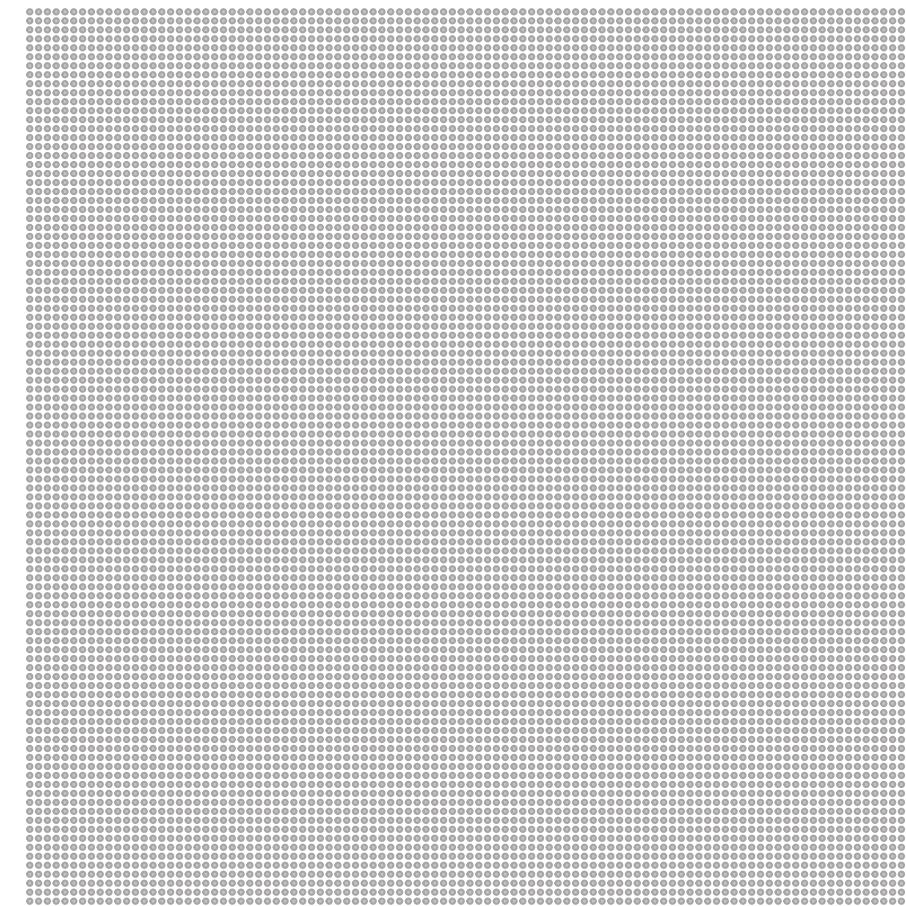
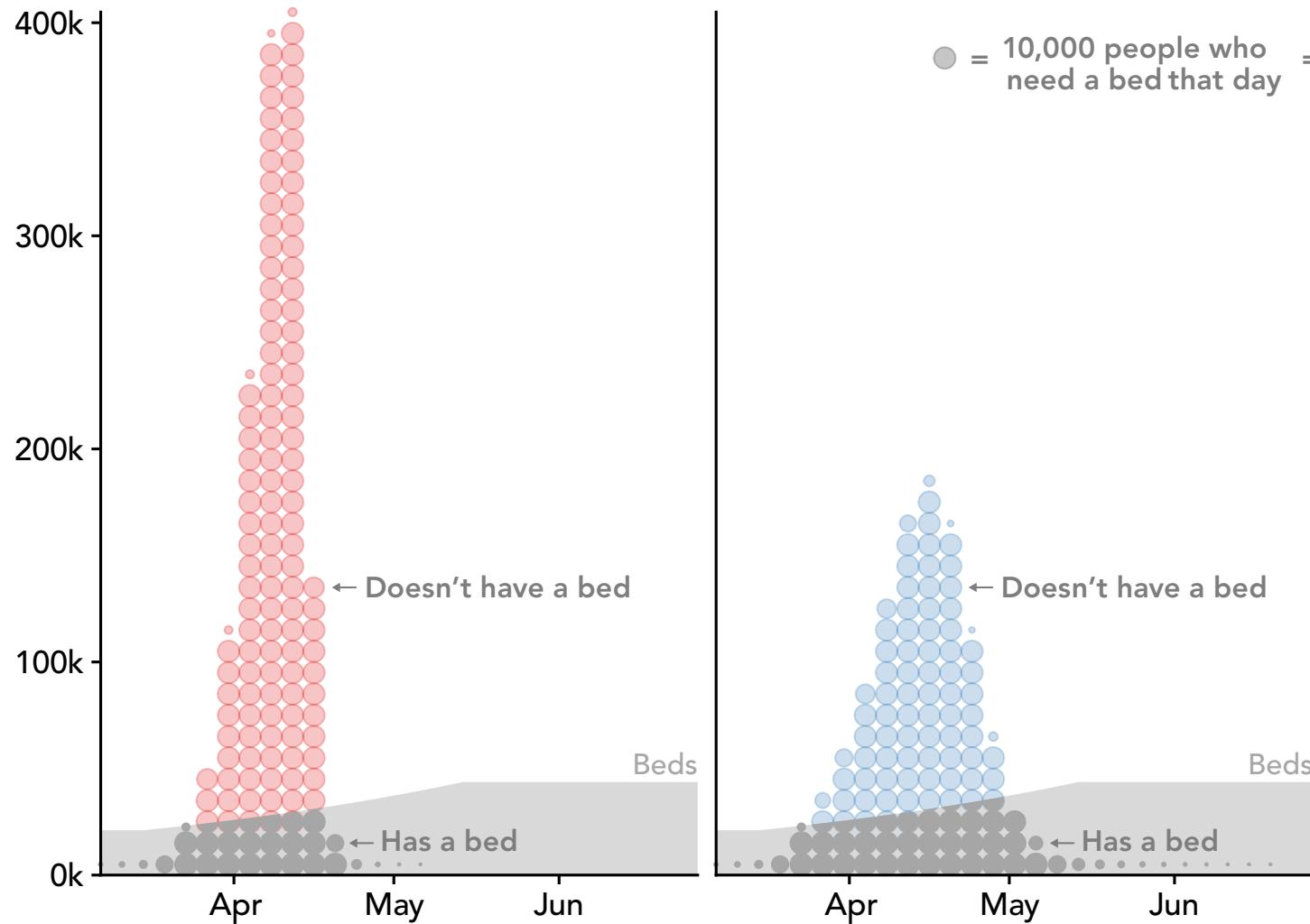


NOTE Data are hypothetical; for illustrative purposes only

People in the hospital at the same time...

When we **DO NOT** flatten the curve

When we **DO** flatten the curve



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Summing up

Uncertainty vis matters in the real world

Small and **large world** uncertainty have real impact

Both must be communicated carefully

Other visualizations to check out

Gun Deaths in America, FiveThirtyEight

<https://fivethirtyeight.com/features/gun-deaths/>

Measles Simulation, The Guardian

<https://www.theguardian.com/society/ng-interactive/2015/feb/05/sp-watch-how-measles-outbreak-spreads-when-kids-get-vaccinated>

Coronavirus Simulator, Washington Post

<https://www.washingtonpost.com/graphics/2020/world/corona-simulator/>

Coronavirus Simulator, 3Blue1Brown

<https://www.youtube.com/watch?v=gxAaO2rsdIs>

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