

# Reaction-diffusion spatial modeling of COVID-19 in Chicago

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- ① The COVID Problem
- ② Project Context and Objectives
- ③ Current Work
- ④ Future Goals



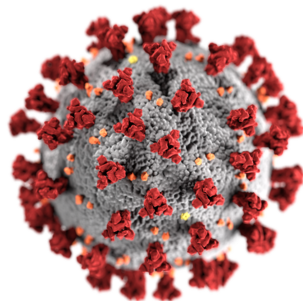
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Identified in Wuhan, China in December 2019.  
Caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).

In the United States alone, we currently have

- **37,768,911** total cases
- **626,833** total deaths

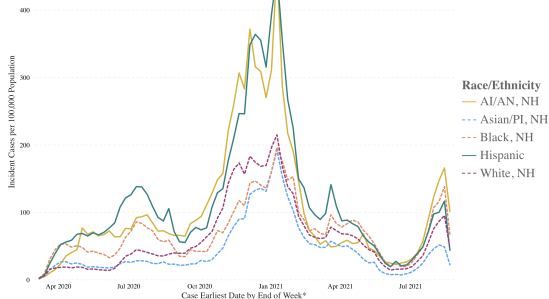




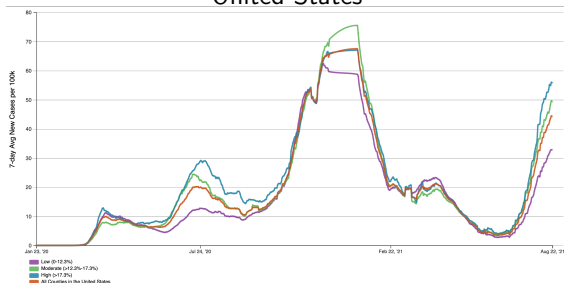
Transmission by exposure to infectious respiratory fluids:

1. Inhalation of virus
2. Deposition of virus on exposed mucus membranes
3. Touching mucous membranes with soiled hands contaminated with virus

COVID-19 weekly cases per 100,000 population by race/ethnicity, United States



COVID-19 weekly case rate per 100,000 population by percentage of county population in poverty, United States





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Models of infectious diseases are usually variations on the **Kermack-McKendrick model** (1927). Usual assumptions:

- Population is *homogeneous*
- Transmission is space-independent

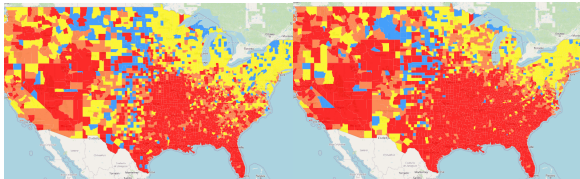


# Project Context and Objectives



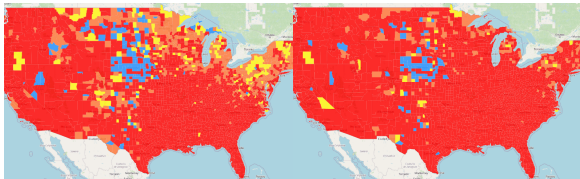
These assumptions don't match reality!

Level of community transmission by county



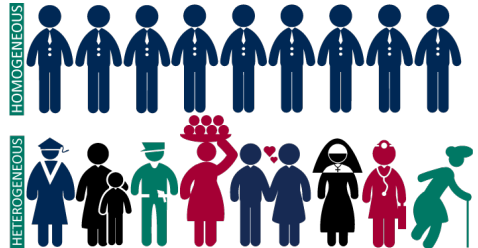
(a) 7/22/2021

(b) 7/29/2021



(c) 8/8/2021

(d) 8/21/2021





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