2019 Novel Coronavirus Outbreak

Anne W. Rimoin, PhD, MPH, FASTMH
Professor
Department of Epidemiology
Director, UCLA-DRC Research Program
Director, UCLA Center for Global and Immigrant Health
University of California, Los Angeles

SARS and MERS

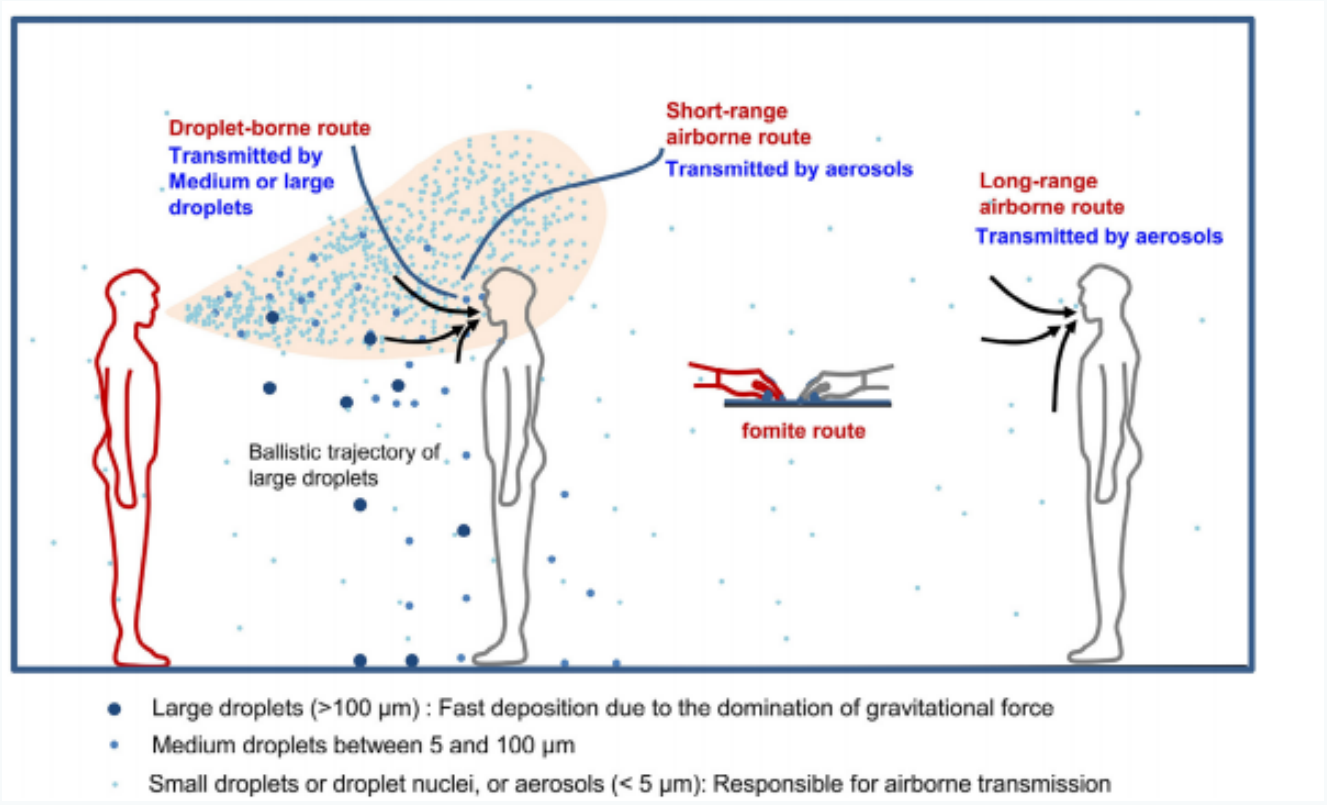
- Pre-SARS (2002), α-coronaviruses inconsequential
- β-coronaviruses- primarily cause lower respiratory tract infections, pneumonia
- High case fatality rates

	SARS	MERS
Cases	8098	2494
Deaths	774	858
Case fatality rate	9.50%	34.40%
Controlled	Yes after reached pandemic	No, continued transmission
Other features	58% cases nosocomial transmission	70% cases nosocomial transmission
Zoonotic Transmission	Himalayan palm civets	Dromedaries
Outbreak Emergence	Guangzhou, China	Saudi Arabia

Emergence of SARS-CoV-2 and COVID-19 disease

Transmission

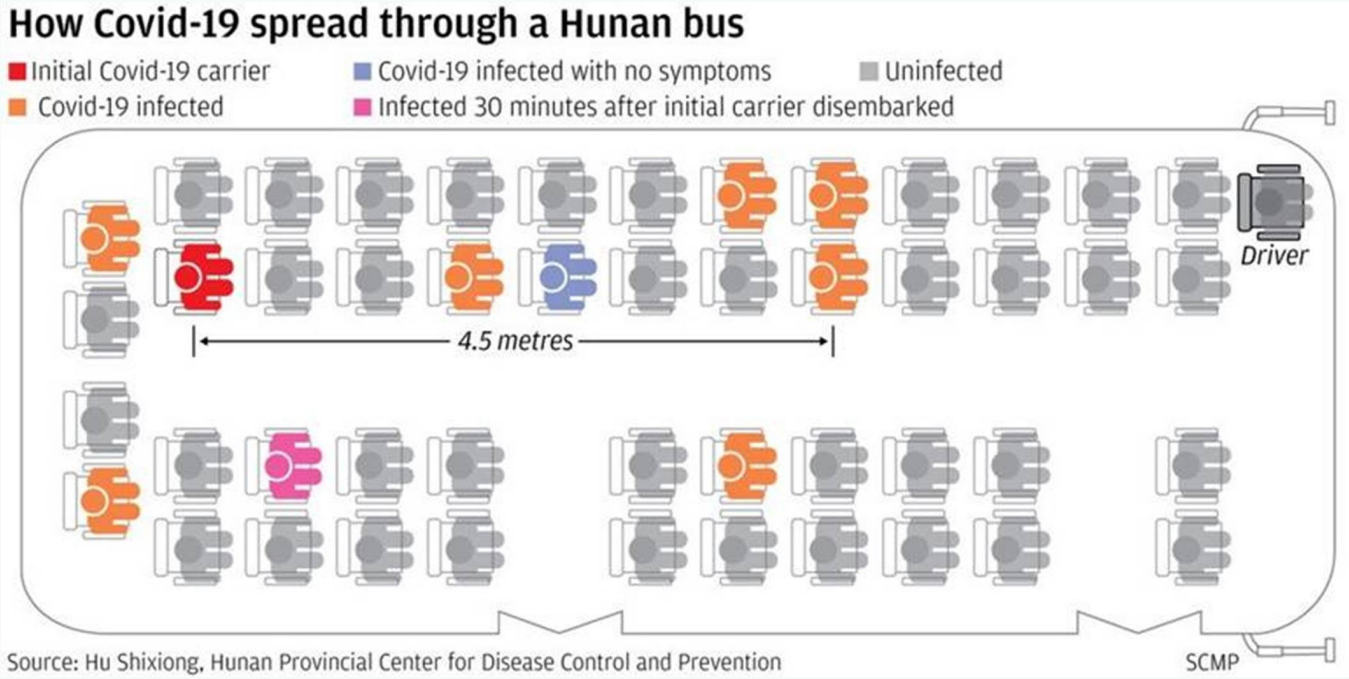
- Similar to seasonal influenza
- Droplet- Primary mode, can travel <6 feet (or more?)
- Hands
- Fomites (surfaces)
- Airborne (small droplets)
- Probable: gastrointestinal



Travel distance is 2x farther than expected

New Research from China:

- Can linger in the air for at least 30 minutes
- Travel up to 15 feet
- Last for days on surfaces where respiratory droplets land
- It can survive for two to three days on glass, fabric, metal, plastic or paper.



"Our advice is to wear a face mask all the way through the bus ride"

Severity of Symptoms

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and coronavirus disease-2019 (COVID-19): The epidemic and the challenges

Chih-Cheng Lai[a], Tzu-Ping Shih[b], Wen-Chien Ko[c], Hung-Jen Tang[d], Po-Ren Hsueh[e,f,*]

17 February 2020

- R_0: 2.24 (95% CI: 1.96-2.55)
- Mean incubation period: 5.1 days
  - 97.5% of symptomatic individuals will develop symptoms within 11.5 days
- Most reported: fever, cough, shortness of breath, muscle ache
- ? % Asymptomatic
- **81% Mild disease (includes mild pneumonia)**
- 14% Severe
- 5% Critical
- Case Fatality Rate (CFR) 2.3% → 3.4% → ?
- Severity increases with comorbidities

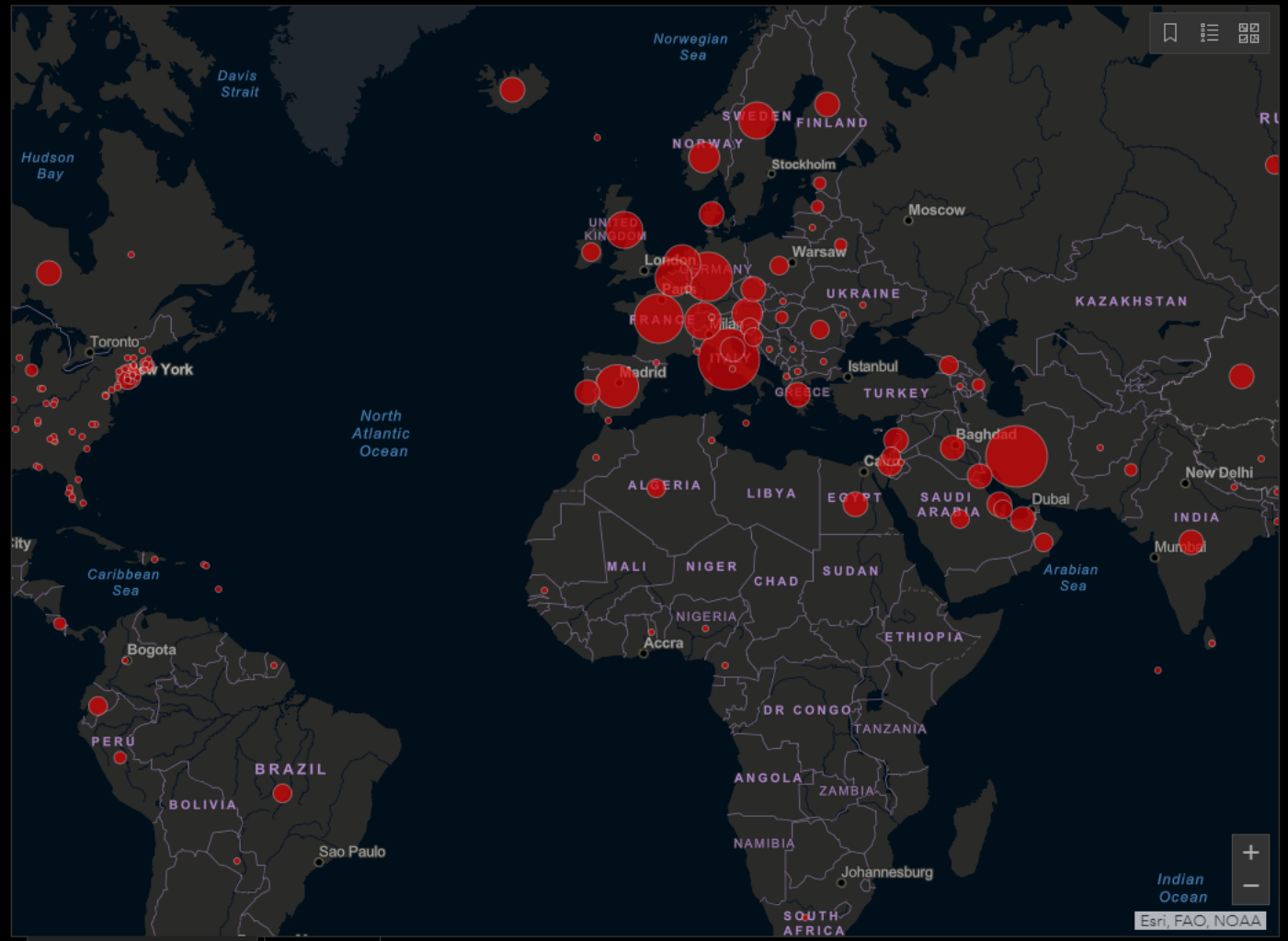
Coronavirus COVID-19 Global Cases by Johns Hopkins CSSE

Total Confirmed
111,362

Confirmed Cases by Country/Region
- 80,735 Mainland China
- 7,478 South Korea
- 7,375 Italy
- 7,161 Iran
- 1,209 France
- 1,151 Germany
- 979 Spain
- 696 Others
- 565 US
- 511 Japan
- 374 Switzerland
- 280 UK
- 265 Netherlands
- 239 Belgium
- 203 Sweden
- 176 Norway
- 150 Singapore
- 132 Canada
- 117 Malaysia
- 115 Hong Kong

Country/Region | City, St/Prov

Last Updated at (M/D/YYYY)
3/9/2020, 7:43:03 AM



Cumulative Confirmed Cases | Active Cases

109
countries/regions

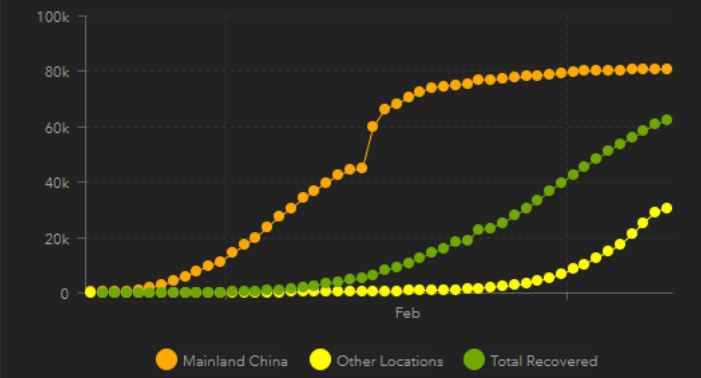
Lancet Inf Dis Article: Here. Mobile Version: Here. Visualization: JHU CSSE. Automation Support: Esri Living Atlas team and JHU APL.
Data sources: WHO, CDC, ECDC, NHC and DXY. Read more in this blog. Contact US.
Downloadable database: GitHub: Here. Feature layer: Here.
Confirmed cases include **presumptive** cases.
Visit the Johns Hopkins Coronavirus Resource Center where our experts help to advance understanding of the virus, inform the public, and brief policymakers in order to guide a response, improve care, and save lives.

Total Deaths
3,892

- 3,008 deaths **Hubei** Mainland China
- 366 deaths Italy
- 237 deaths Iran
- 53 deaths South Korea
- 25 deaths Spain
- 22 deaths **Henan** Mainland China
- 19 deaths France
- 17 deaths Japan
- 17 deaths **King County, WA** US
- 13 deaths **Heilongjiang** Mainland China

Total Recovered
62,392

- 46,488 recovered **Hubei** Mainland China
- 2,394 recovered Iran
- 1,260 recovered **Guangdong** Mainland China
- 1,247 recovered **Henan** Mainland China
- 1,176 recovered **Zhejiang** Mainland China
- 984 recovered **Anhui** Mainland China
- 979 recovered **Hunan** Mainland China
- 923 recovered **Jiangxi** Mainland China
- 700 recovered **Shandong** Mainland China
- 622 recovered Italy



Actual | Logarithmic | Daily Cases

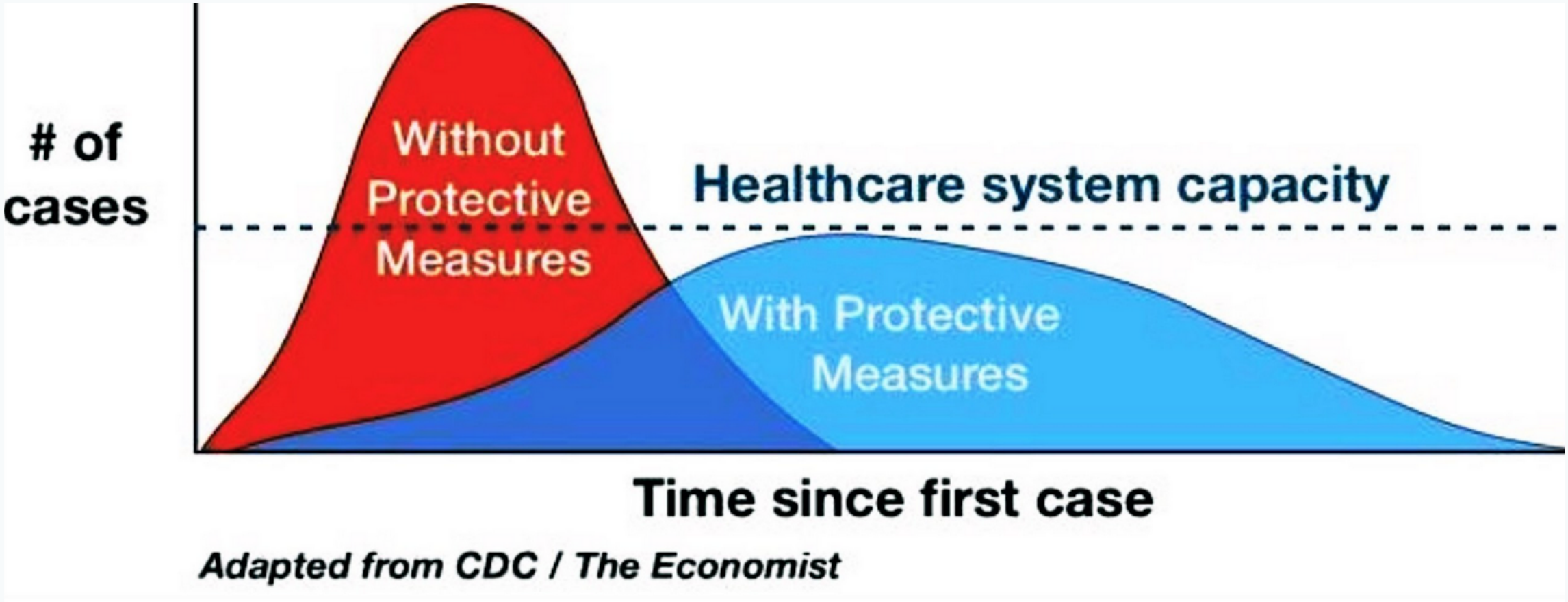
Accurate case counts are needed to inform government decision making.

Case counting is an effort itself

- Contact tracing
  - Community transmission is rapidly increasing, soon contract tracing will be obsolete and tracking the spread will be impossible
- Who's managing the outbreak & how?
  - Chain of command
  - Reporting system
- Where is the command center (is the ICS system activated?)

As cases continue to increase the healthcare system will begin to be overburdened.

Goal: Flatten the Curve



Hospital preparedness for influx of patients

- Current Hospital Capacity
- Nursing homes
  - Dr. Tom Frieden: "It's time to restrict visits to nursing homes"
- Where would overflow hospitals go?
- How many negative pressure rooms and emergency tents are available
- PPE supplies, will there be shortages?
- Emergency transportations—only EMS? Private ambulances?

Organization of COVID-19 Tests

- Who is eligible?
- Centralized or decentralized testing?
- How many tests are in LA hospitals?
- How to achieve rapid, safe testing?
- Cost of test for un- & under-insured?
- How much can PHL test per day?
- Will there be run off labs?
- Syndromic surveillance + self-quarantine to free up hospital system

Eventually mass action will need to take place. In order to achieve this, several things have to happen at once.

Closings

Schools, work, public transit all related, can't cancel one without the others

- How to incentivize businesses to follow guidelines and close?
- "Snow day" restrictions
- Commerce
  - Telecommuting
  - Issue: hourly workers who can't work from home
- Public transit
- Close mass gatherings

As advice and restrictions change, city messaging must be clear and offer two-way communication.

Establishing public trust via competent messaging

- Provider Messaging
  - Health Alert Network (HAN)
  - Weekly provider calls
- Public Messaging
  - Clear messages and asks
  - How to quarantine effectively
  - Centralized website for public notification
  - Proper channels for notifying officials
  - Telemedicine
- Public Q&A channels for providers and public health officials
  - Portals, forums, call centers

Key Issue: How to create successful containment methods without disenfranchising Angelinos?

Special populations will need specific protocols and consideration

Homeless populations

The congregate housing and shared bathrooms of shelters make them ripe for rapid disease spread.

- Baseline: high rates of uncontrolled chronic disease, high rates of mental health issues, high rates of substance use
- Challenges to both shelter-based and street-based populations
  - Need homeless-specific protocols
- Shelter crowding- social distancing impossible
  - Room isolation for symptomatic or test-positive individuals?
- Plan for COVID-19 positive individuals
  - How will hospitals handle a COVID-19 positive individual

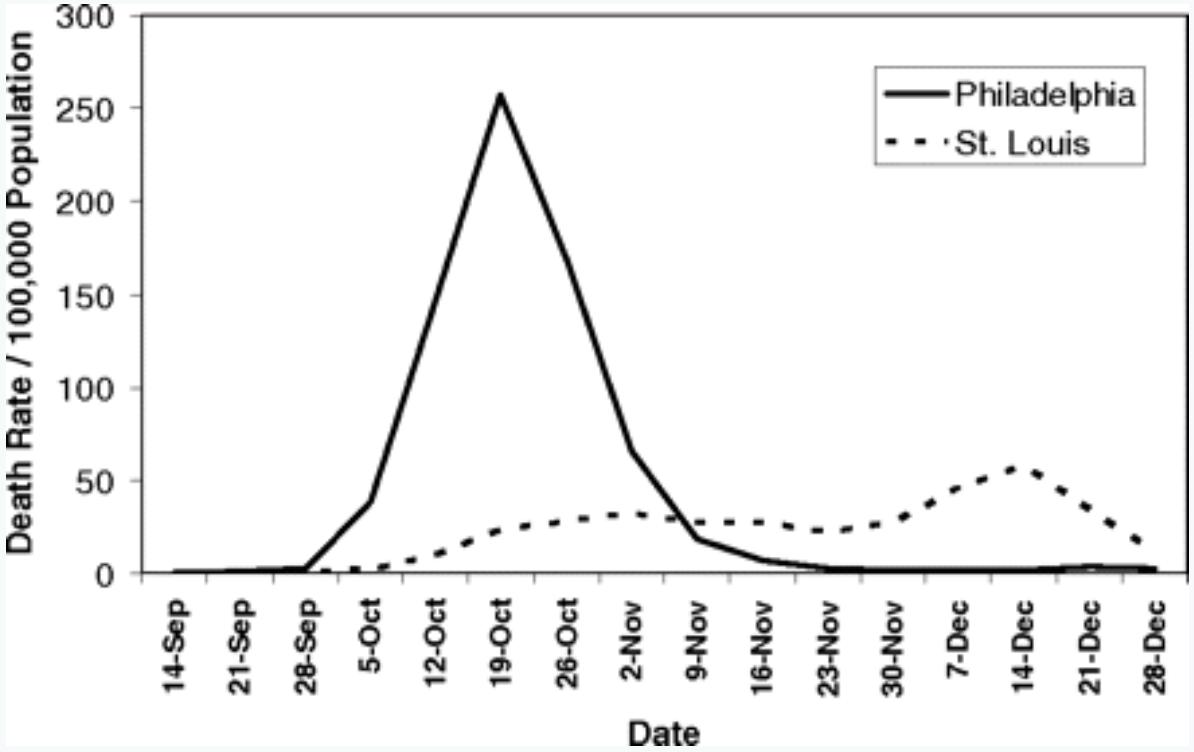
Detained populations

- Prisons and ICE detention facilities will need their own protocols
- Baseline: Higher underlying comorbidities, older average age
- Correctional health systems are built to take care of one patient at a time

Early and preventative actions are critical.

1918 Flu Pandemic: St. Louis vs Philly

- The 1918 influenza pandemic - estimated 500,000–675,000 deaths in the U.S.
- Philadelphia downplayed severity of disease
  - City-wide parade on September 28, 1918
  - Social distancing interventions were not implemented until October 3
  - Disease spread had already begun to overwhelm local medical and public health resources.
- St. Louis reacted quickly
  - Cases reported on October 5, broad series of measures implementing on October 7



Thank you