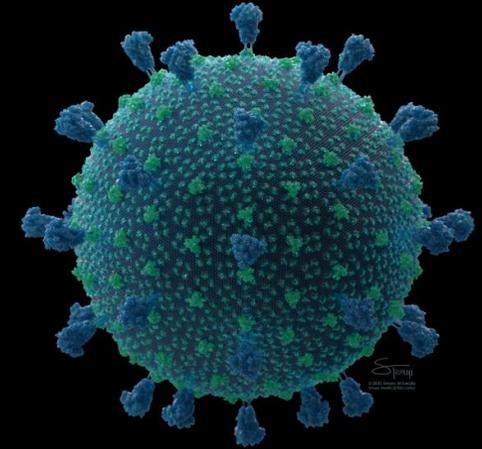
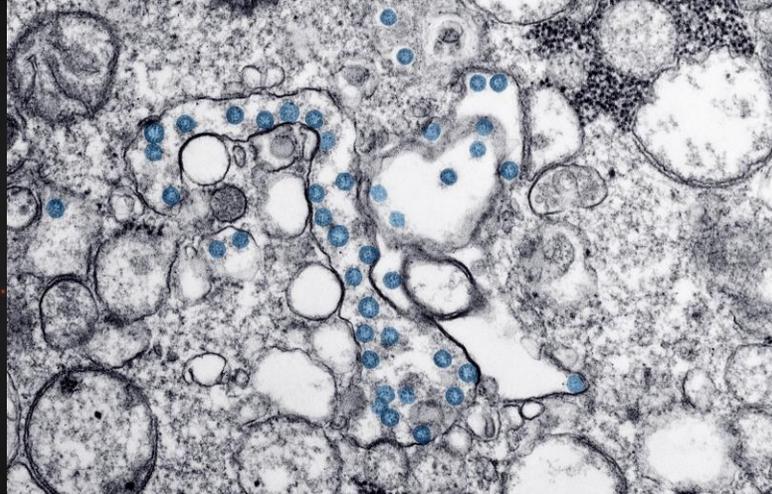
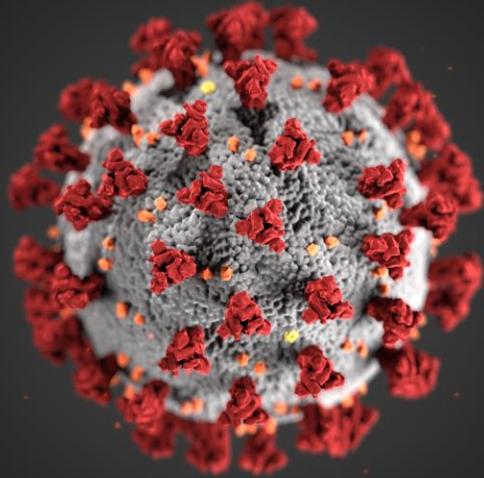


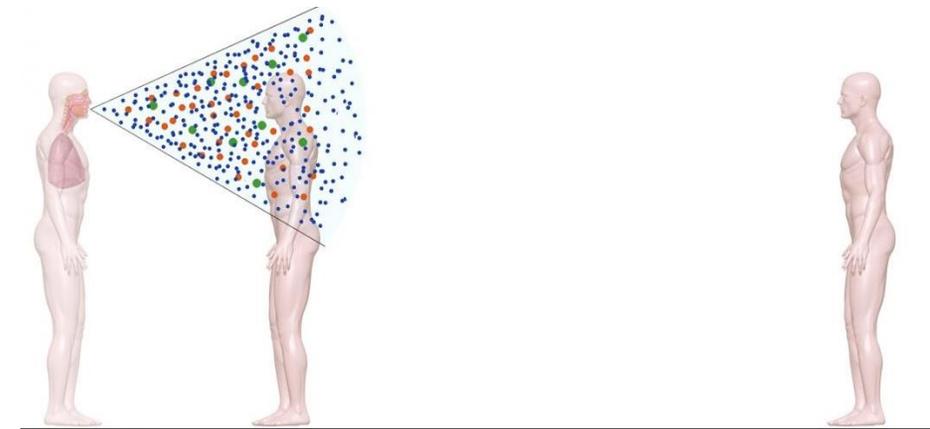
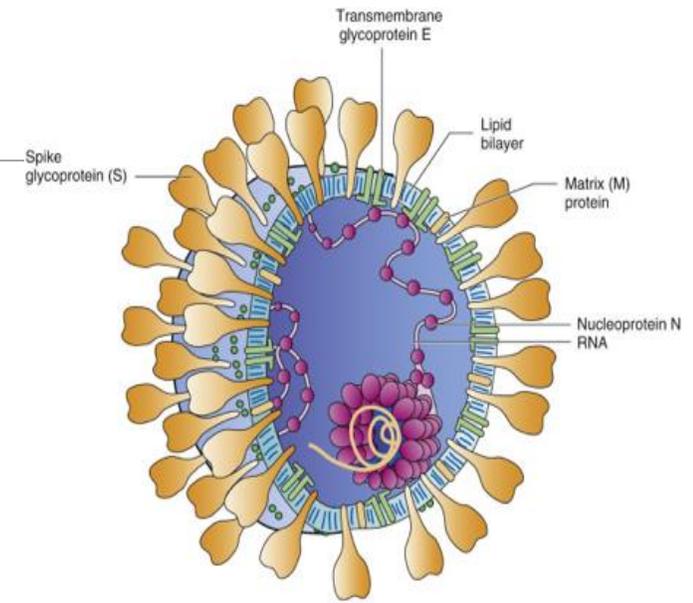
# COVID-19: What to Watch



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Professor  
Chief, Division of Infectious Diseases  
and Geographic Medicine

# What Is Coronavirus?

- Enveloped +RNA virus named for solar corona-like appearance
- Four subspecies cause ~30% of common cold cases
- They replicate at lower temperatures, thus predilection for upper respiratory tract.
- Transmitted by respiratory droplets and mainly transmit from person-to-person
  - when an infected person coughs or sneezes between people within about 6 feet of one another
- To a lesser extent, from touching a contaminate surface or object and then touching one's face



# COVID-19

## SYMPTOMS\* OF CORONAVIRUS DISEASE

**Patients with COVID-19 have reportedly had mild to severe respiratory illness. Symptoms can include**

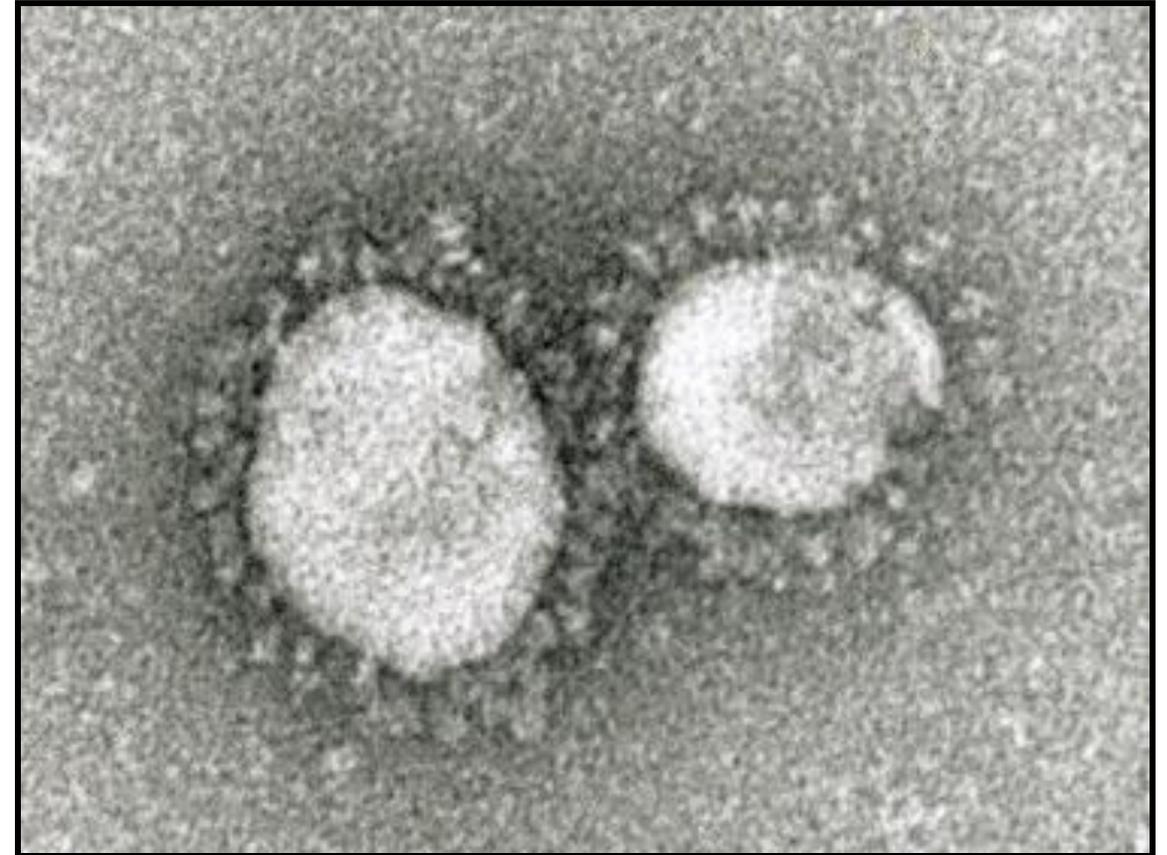
- Fever
- Cough
- Shortness of breath

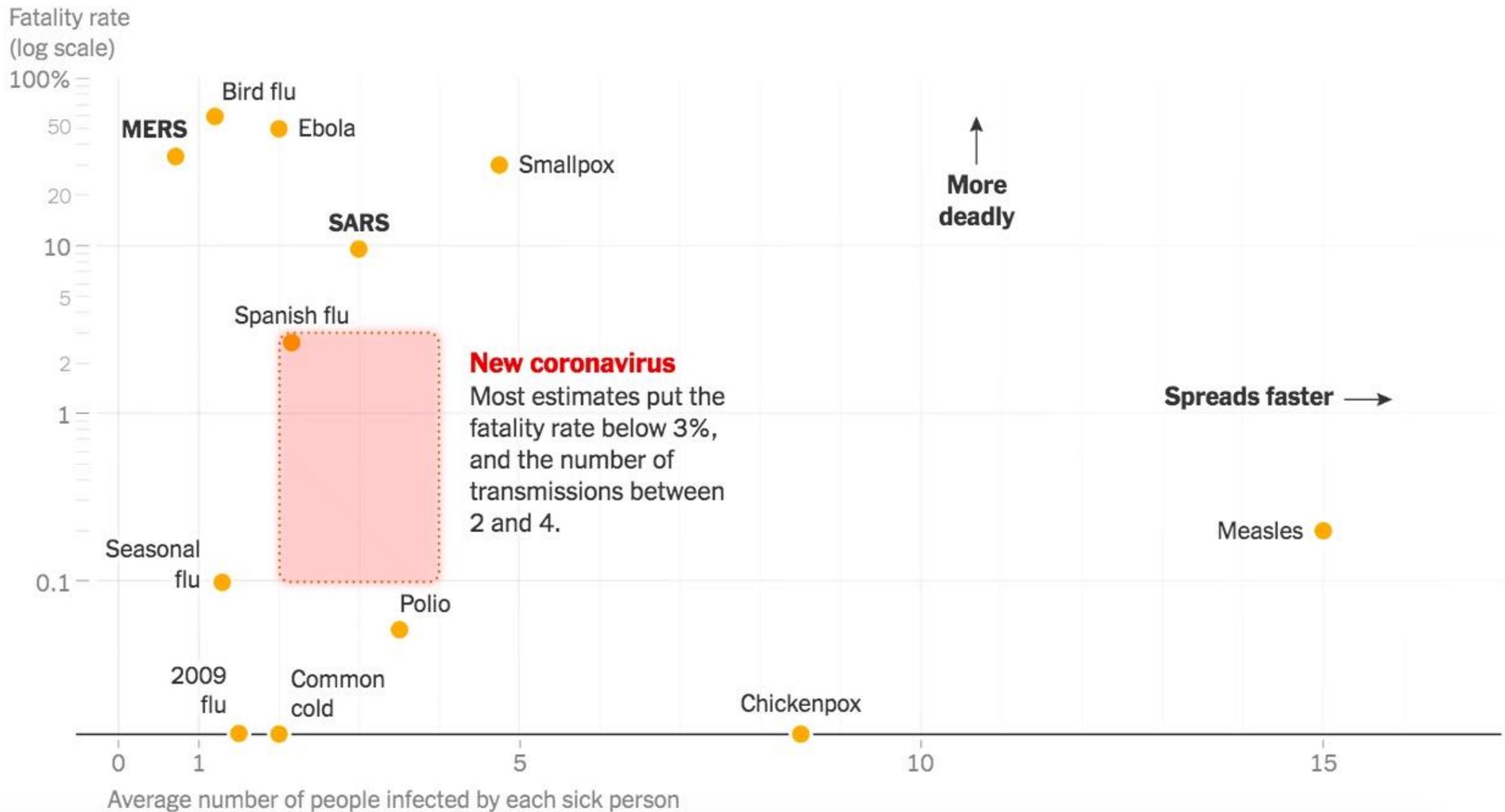
**\* Symptoms may appear 2–14 days after exposure. If you have been in China within the past 2 weeks and develop symptoms, call your doctor.**



[www.cdc.gov/COVID19](http://www.cdc.gov/COVID19)

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# Prevention

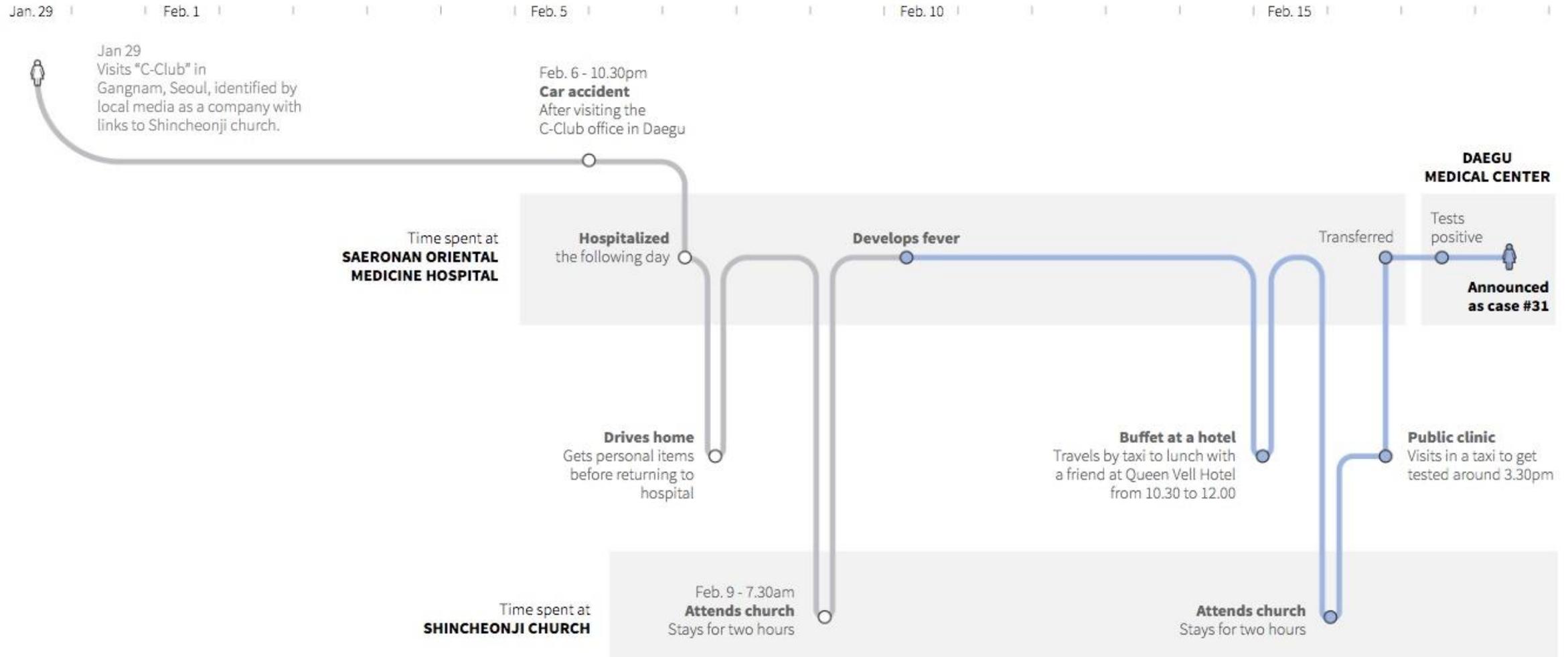
- Country-level coordination, planning and monitoring
- Risk communication and community engagement
- Surveillance, rapid response teams, and case investigation
- National laboratories
- Infection prevention and control
- Case management
- Operational support and logistics



**STAY HOME. SAVE LIVES.**  
Help stop coronavirus

- 1 **STAY** home as much as you can
- 2 **KEEP** a safe distance
- 3 **WASH** hands often
- 4 **COVER** your cough
- 5 **SICK?** Call ahead

# A COVID-19 Super-Spreader in South Korea



One patient with 1,160 contacts

# Non-pharmaceutical Interventions (NPIs)

- Actions, outside of getting vaccinated and taking medicine to help slow the spread of illnesses like COVID-19
- NPIs = **community mitigation strategies** for any new virus which the human population has little or no immunity against.

- Three types of NPIs:



- **Personal NPIs** – everyday **preventive actions** (staying home when sick, covering coughs and sneezes, proper hand hygiene) + **home quarantine**
- **Community NPIs** – strategies organizations and community leaders can use to help limit face-to-face contact (sick-leave policies, school dismissals, etc.)
- **Environmental NPIs** – surface cleaning measures that remove germs from frequently touched surfaces

# Personal NPIs

## Personal protective measures for everyday use

- **Voluntary home isolation** – staying home or self-isolating while ill
- **Respiratory Etiquette** – covering coughs and sneezes in appropriate manner
- **Hand Hygiene** –hand hygiene OFTEN

## Personal protective measures reserved for pandemics

- **Voluntary home quarantine** – for non-ill household members of persons with influenza
- **Use of face masks in community settings** (other than healthcare workers) to prevent spread to household members and others in the community



# Community NPIs – School Closures

**School closures and dismissals** – include temporary closures and dismissals of childcare facilities, K-12 schools, and higher education institutions

**Social Distancing** measures can reduce virus transmission by decreasing the frequency and duration of social contact among persons of all ages.

- These include common sense approaches such as limiting face-to-face contact, which reduces person-to-person transmission



# Community NPIs – Social Distancing

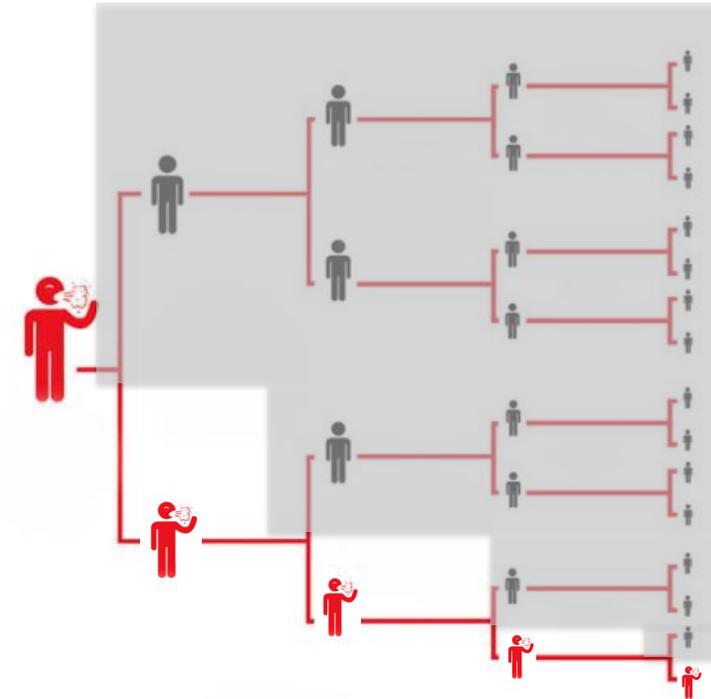


Optimal strategy: implement these measures simultaneously

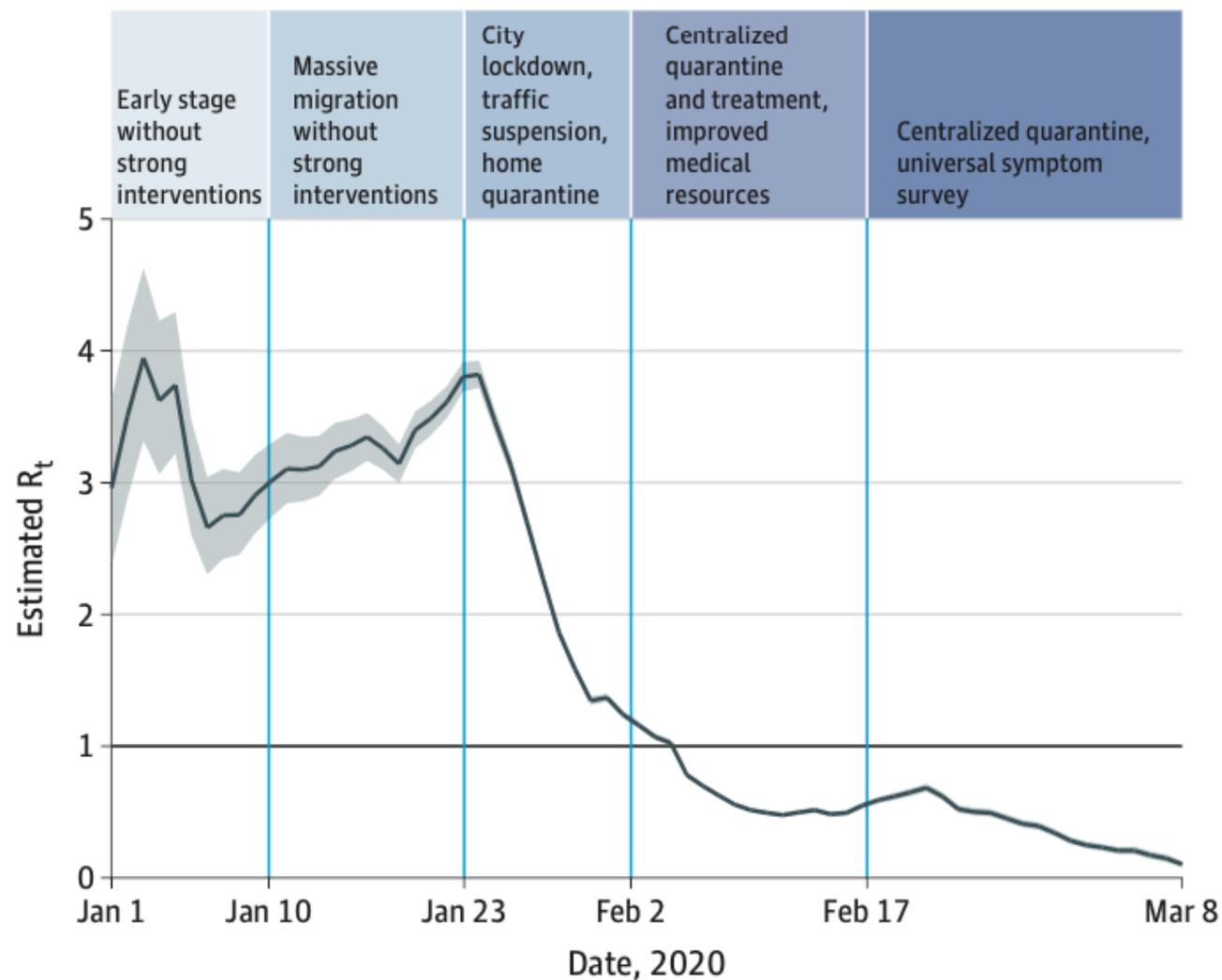
- **Schools** – Children have higher influenza attack rates than adults, and transmission is common in schools
- **Workplaces** – More than half of all US adults participate in the workforce, and many share office space and equipment and have frequent face-to-face contact
- **Mass gatherings** – Group events such as concerts, festivals, and sporting events bring people into close contact for extended periods

# $R_t$ Represents Contagiousness

- $R_t$  measures how effective social distancing measures are after over time
- If social distancing and measures like masking are effective, then the number of secondary infections is dramatically reduced.
- In this scenario where social distancing measures were 50% effective, then only **five people** end up infected, rather than the original 31.

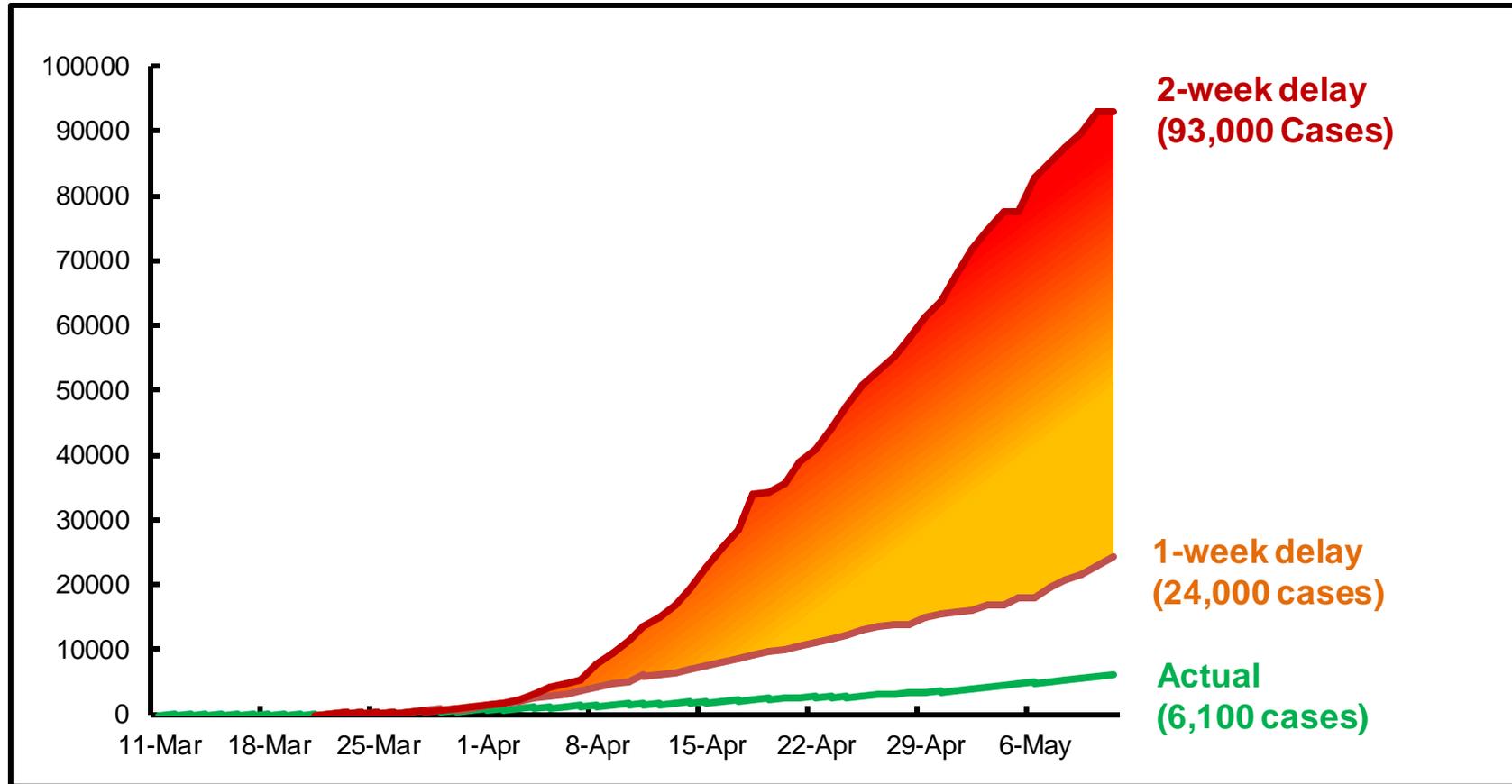


## What Happened in Wuhan?



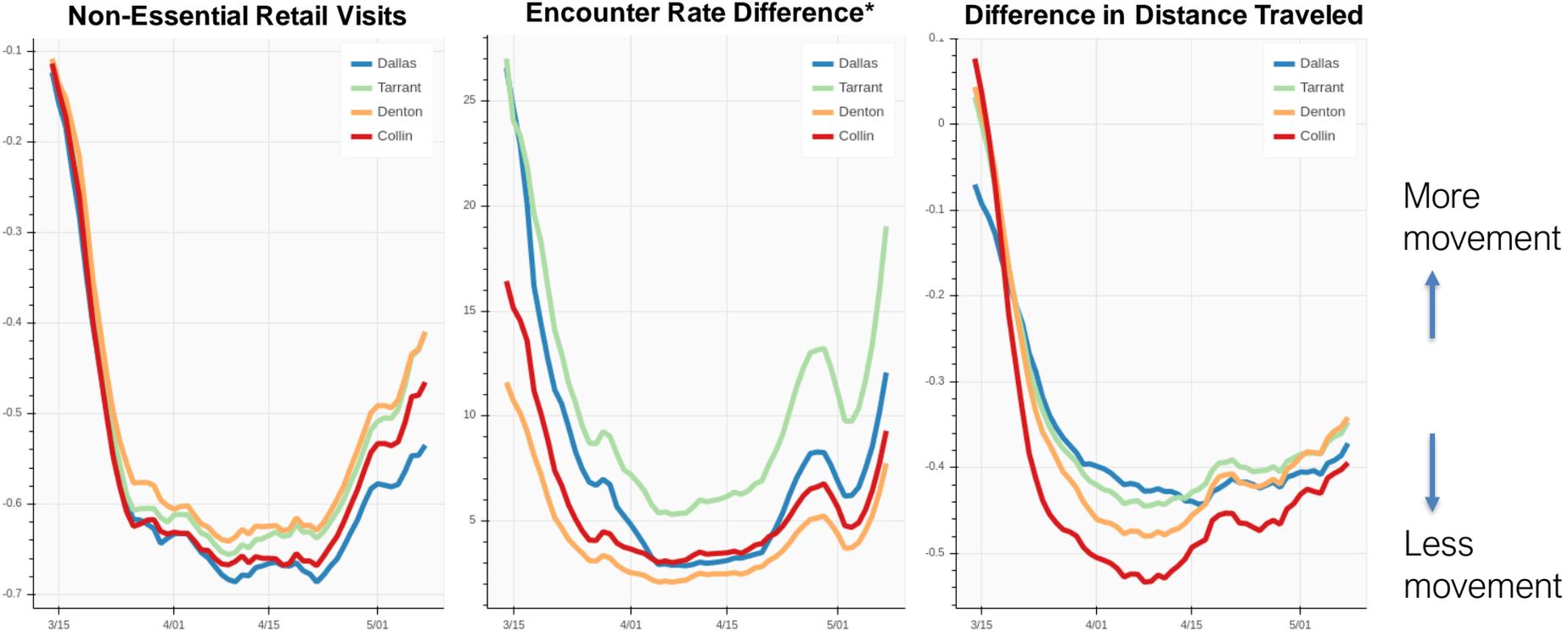
*Ingelsby JAMA 2020*

If Dallas County had not put into place social distancing measures when it did, our confirmed case counts could be catastrophically higher than they are today.



Source: JHU CSSE COVID-19 US Confirmed Case Data, Accessed May 12, 2020  
 Methods: Hypothetical scenarios assume that Dallas County policies maintained pre-March 22 trajectory of doubling cases every 2.5 days for 1 week or 2 weeks respectively, then resumed its actual daily growth progression thereafter

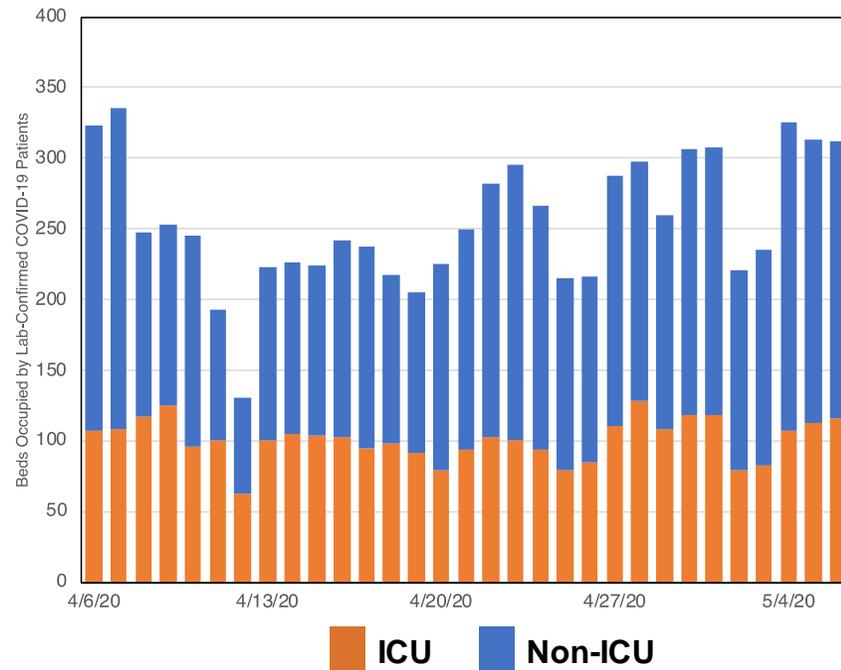
# Are North Texans staying at home now?



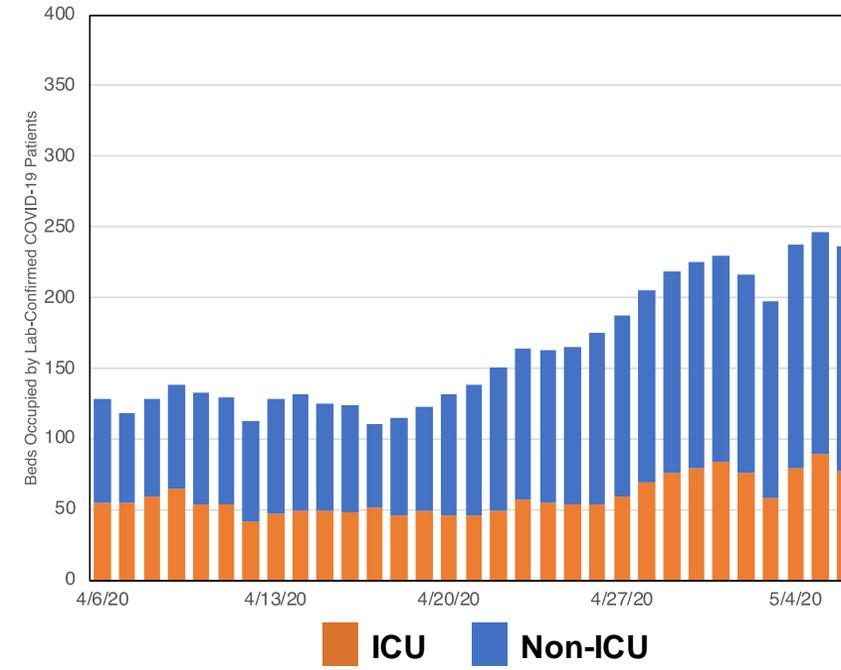
Visits to non-essential stores, encounters between people, and the overall distance that people traveled fell sharply from mid-March to early April. Beginning in the 3<sup>rd</sup> week of April, movement increased and continues to increase. We follow these trends closely to understand how well people are social distancing, which in turn helps us revise our model to predict any trouble on the horizon.

\*The encounter rate difference is the rate of unique human encounters per km<sup>2</sup> relative to the national pre-COVID-19 baseline.  
 Source: UnaCast Mobility Data, showing trailing 7-day averages, accessed May 11, data through May 8.

**Total Hospitalized COVID-19+ Patients in Dallas County**

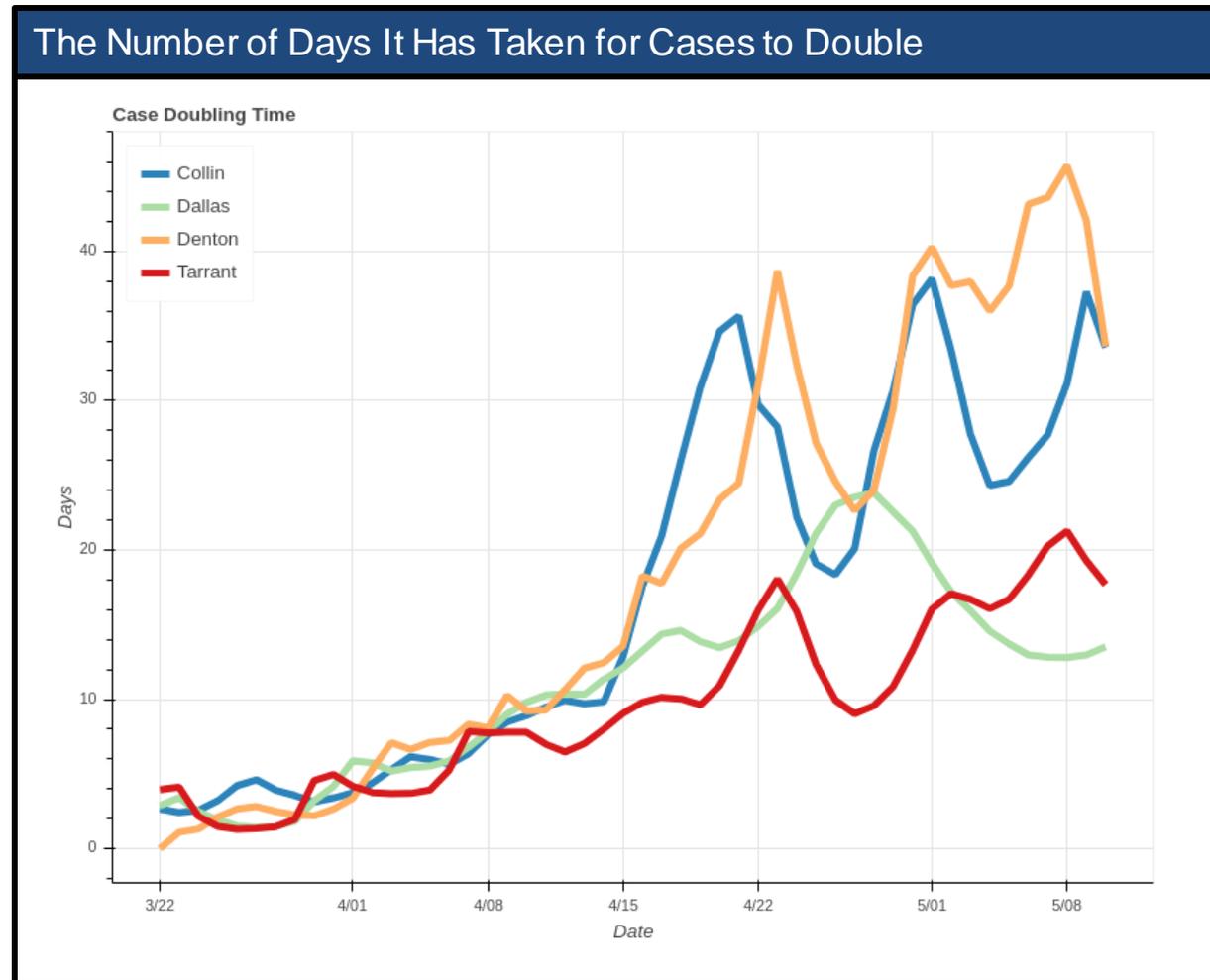


**Total Hospitalized COVID-19+ Patients in Tarrant County**



We closely track daily hospitalizations, since this is a reliable way to monitor the severity of the outbreak in DFW.

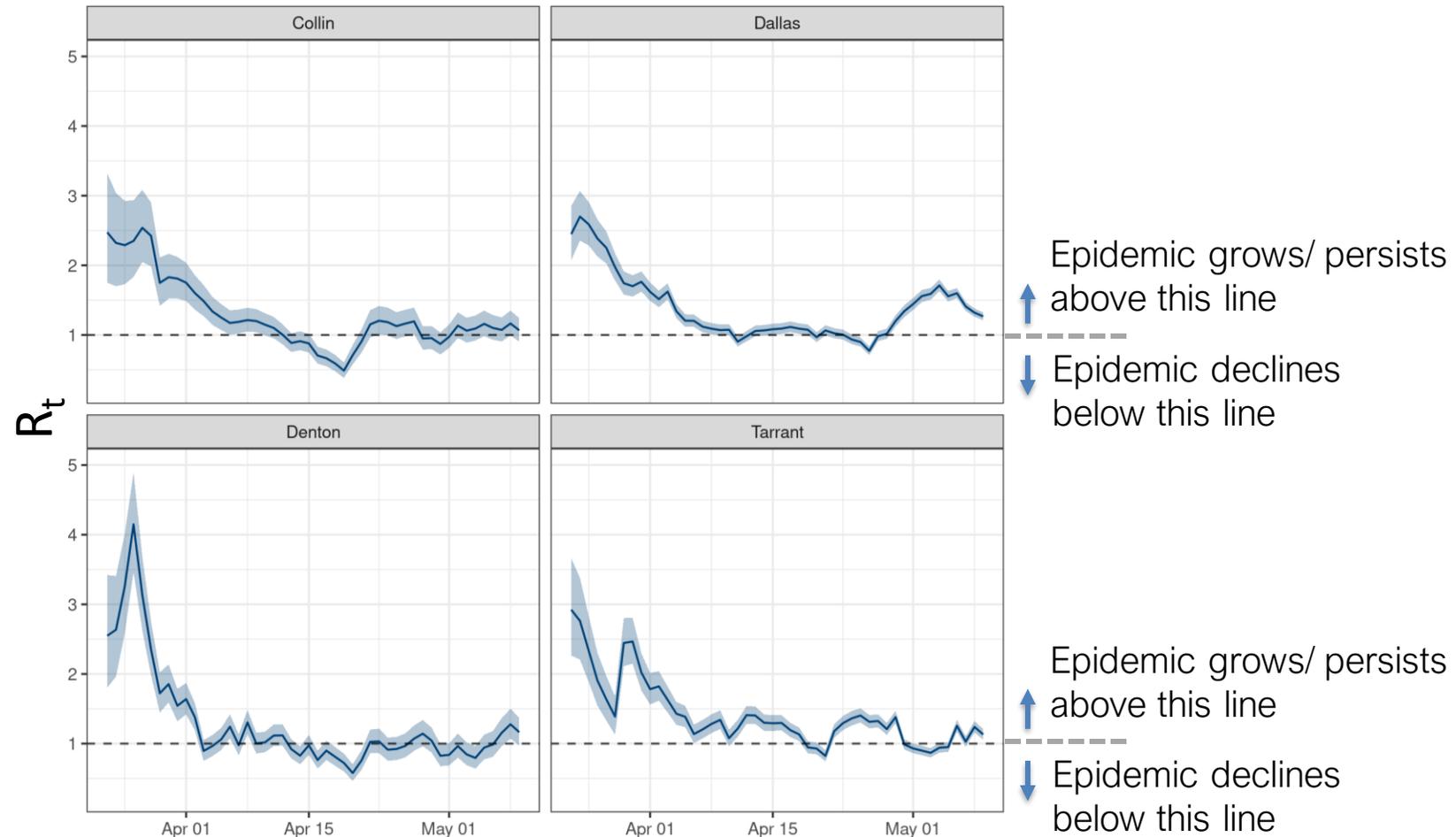
# How quickly is COVID-19 spreading in North Texas?



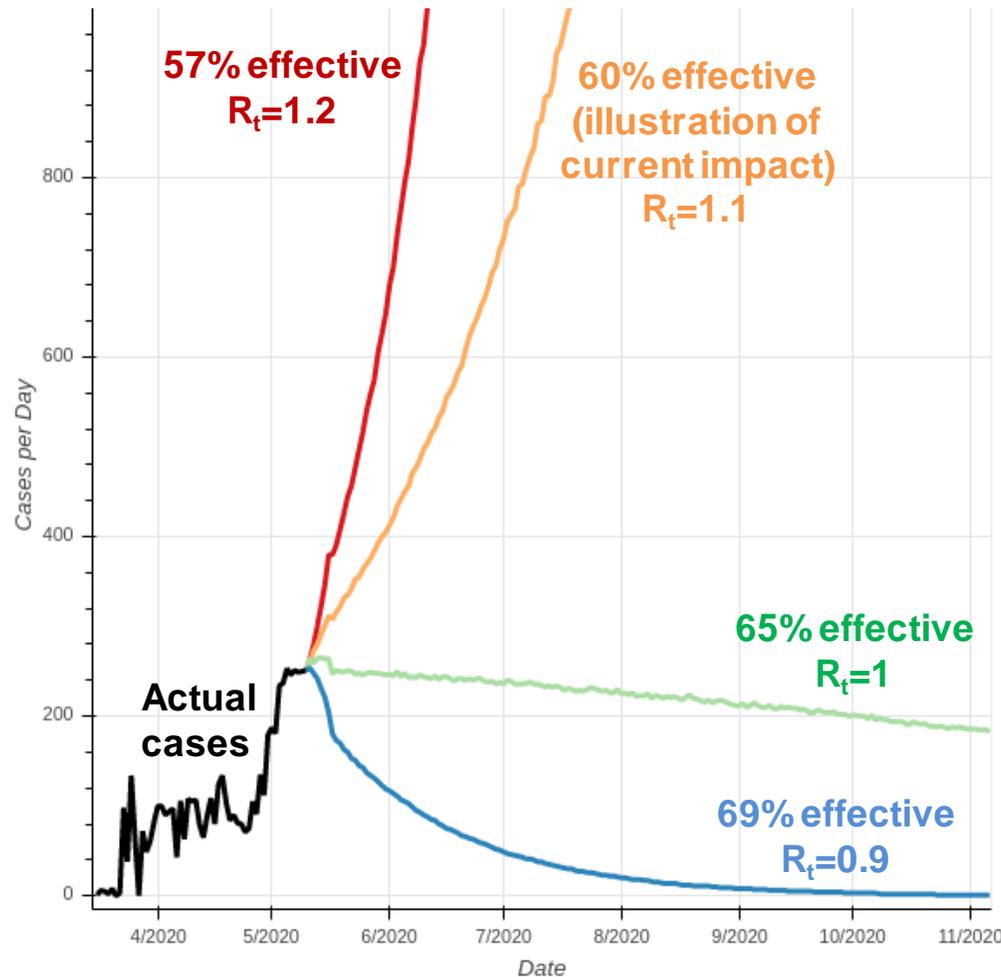
As the spread of disease slows, it takes longer for COVID-19 cases to double.

# How contagious is COVID-19 in DFW now?

Each line represents how contagious COVID-19 has been in DFW counties over the last few weeks. Contagiousness depends on how well we social distance, wear masks, limit travel, clean high touch surfaces, etc. During the stay-at-home time, the virus was not that contagious but has since gotten more so and will continue to fluctuate.



Actual and Predicted Daily New Infections in Dallas County



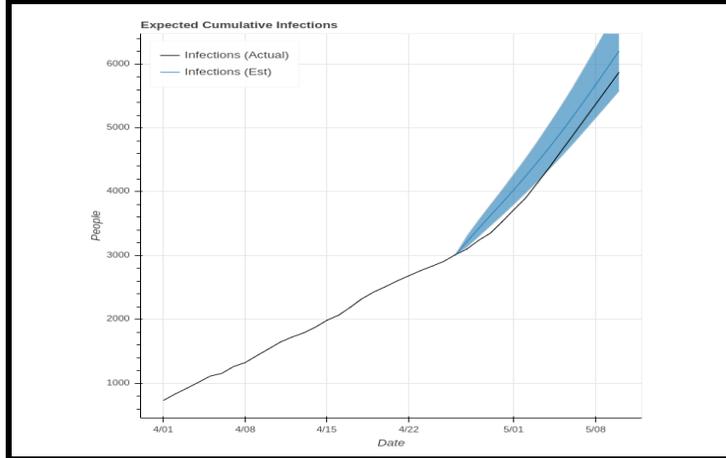
Social distancing & other prevention measures are **currently ~60% effective** at curbing the spread of COVID-19.

- If measures were **57% effective**, the **red line** would happen.
- If measures remain **60% effective**, the **orange line** would happen.
- If measures were **65% effective**, the **green line** would happen.
- If measures were **69% effective**, the **blue line** would happen.

Note: model assumes perfect isolation of hospitalized cases, which has a dampening effect on effective  $R_t$

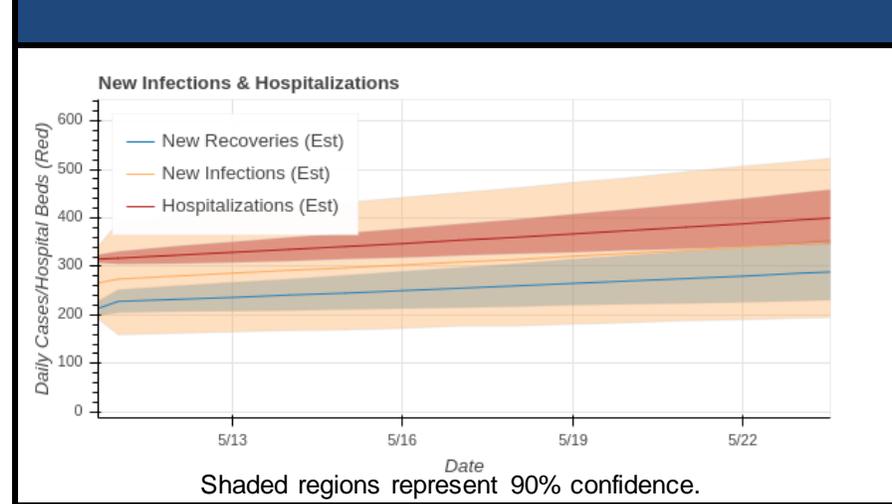
# Dallas County – Past Model Accuracy and Future Forecasting

**Dallas County 14-day forecast starting from 4/26 compared to actual data**



- The graph above demonstrates how well our model would have predicted the past two weeks of COVID-19 cases had we run the current model two weeks ago. Predicted COVID-19 infections are represented by the blue line (shaded area represents 90% confidence interval), and the black line shows actual reported COVID-19 infections. This suggests that the model predicted the number of cases with 90% confidence.

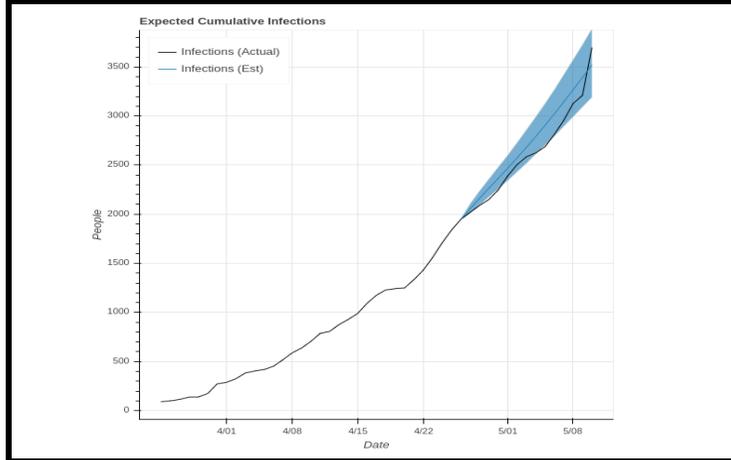
**Dallas County 14-day forecast starting from 5/10**



- Dallas County COVID-19 hospitalizations (red line) are predicted to resume their increase within 2 weeks, reaching between 350-460 concurrent hospitalized cases.
- New COVID-19 infections (orange line) are expected to outpace new recoveries (blue line) slightly, meaning that the number of new COVID-19 infections will continue to increase to ~350 new cases per day.

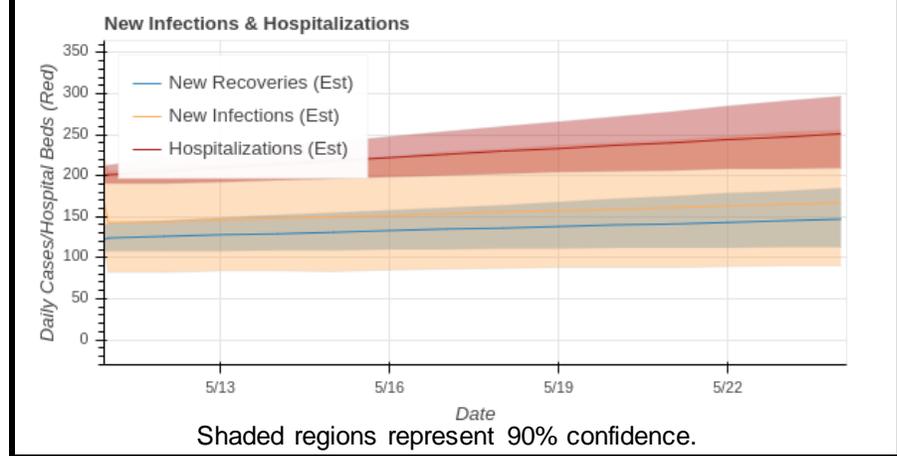
# Tarrant County – Past Model Accuracy and Future Forecasting

**Tarrant County 14-day forecast starting from 4/26 compared to actual data**



- The graph above demonstrates how well our model would have predicted the past two weeks of COVID-19 cases had we run the current model two weeks ago. Predicted COVID-19 infections are represented by the blue line (shaded area represents 90% confidence interval), and the black line shows actual reported COVID-19 infections. This suggests that the model predicted the number of cases with 90% confidence.

**Tarrant County 14-day forecast starting from 5/10**



- Tarrant County COVID-19 hospitalizations (red line) are predicted to resume their increase within 2 weeks, reaching between 210-300 concurrent hospitalized cases.
- New COVID-19 infections (orange line) are expected to outpace new recoveries (blue line) slightly, meaning that the number of new COVID-19 infections will continue to increase to ~160 new cases per day.

# Where Do We Need To Go?

- Communicate important public health messaging **ie consistent**

## Message

- Engage the community **ie PSA**
- Dedicate resources to public health and support public health messaging
- Enhance/Expand surveillance **ie Testing**
  - more, vulnerable communities
- Assure resources to investigate cases **ie Contact Tracing**
- Expand and improve laboratory capacity **ie state and regional**
- Assure we have equipment/supplies **ie PPE**
- Solidify and support healthcare infrastructure to support **ie the next wave**
- Enhance research infrastructure **ie partner with key academic and NGO organizations ie seroprevalence**

