



COVID-19 update

Delaware Academy of Medicine

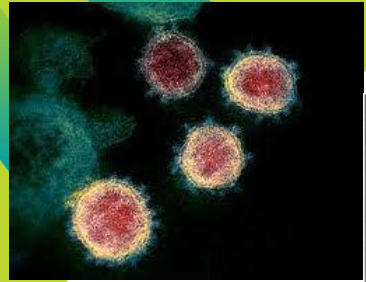
Delaware Public Health Association

Mini Medical School

April 23, 2021

14 Places Are At The Highest COVID-19 Risk Level

Data as of April 20



RED	ORANGE	YELLOW	GREEN
Threshold: 25+ daily new cases per 100,000 people	Threshold: 10-24 daily new cases per 100,000 people	Threshold: 1-9 daily new cases per 100,000 people	Threshold: <1 daily new case per 100,000 people
Indicates: unchecked community spread	Indicates: escalating community spread	Indicates: potential community spread	Indicates: close to containment



THE HIGHEST-RISK PLACES INCLUDE:

STATE	RISK LEVEL	AVG. THIS WEEK	PER 100K	2 WEEK TREND
Michigan	RED	5,948 new cases/day	60 per 100K	-11%
New Jersey	RED	3,422 new cases/day	39 per 100K	-16%
Delaware	RED	367 new cases/day	38 per 100K	+15%
Pennsylvania	RED	4,584 new cases/day	36 per 100K	+9%
Rhode Island	RED	369 new cases/day	35 per 100K	-7%

Tracking The Spread Of The Coronavirus Globally

Data as of April 20

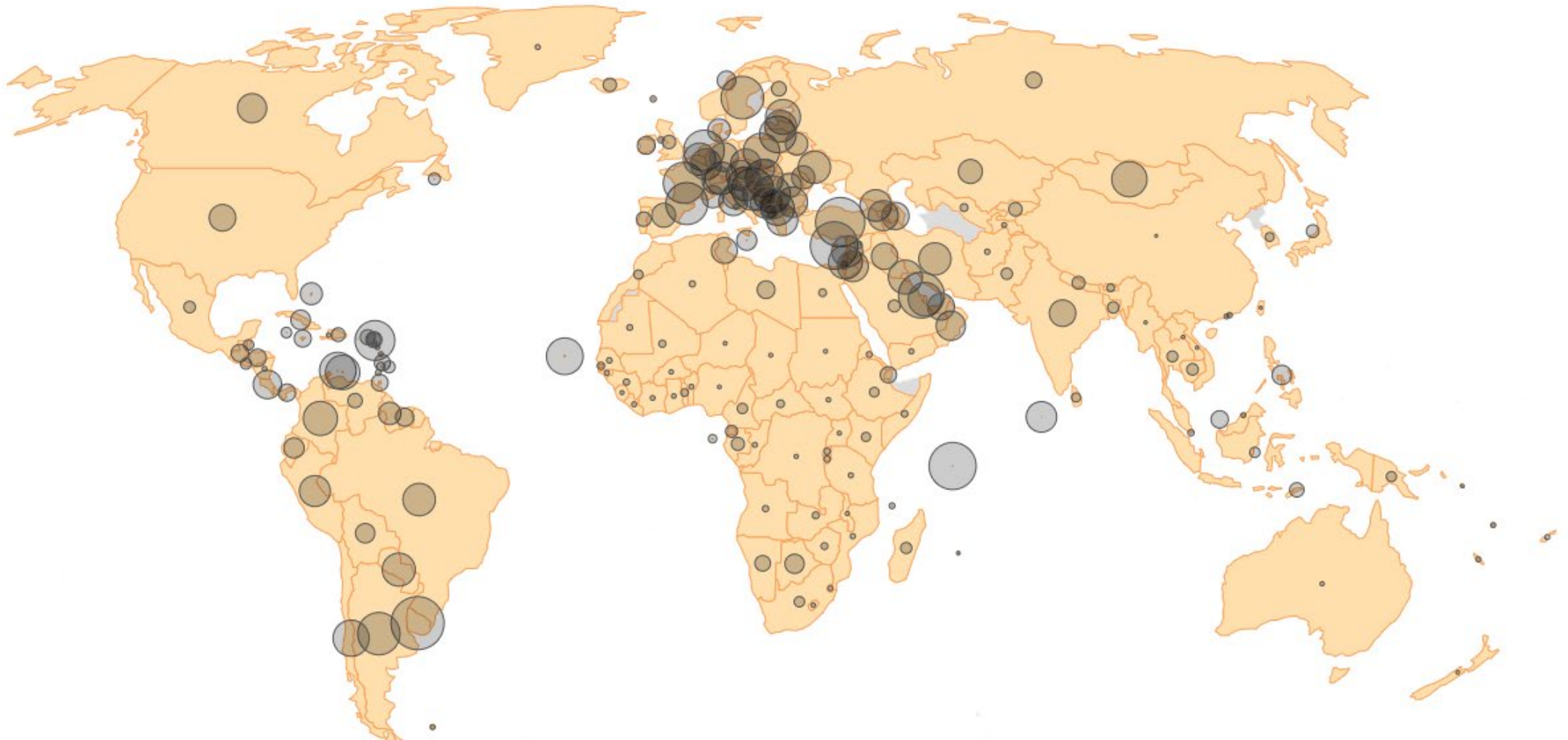
NEW CASES

NEW CASES PER 100K

TOTAL CASES

TOTAL CASES PER 100K

New cases in past week per 100,000 people





Agenda

- Coronaviridae
- The Pandemic today
- Treatment/Vaccines
- Transmission/Prevention?
- Going forward



Coronaviridae

- Enveloped, positive strand RNA Viruses
- Infect Birds, mammals, amphibians
 - Letovirinae -> Alphaletovirus -> Milecovirus -> Microhyla letovirus 1 (frog)
 - Orthocoronavirinae
 - Alpha, Gamma, Delta found in pigs, bats, rat, human, goose, birds, whale
 - Betacoronavirus have species of human concern
 - Merbecovirus-> MERS-CoV
 - Sarbecovirus -> SARS-CoV, SARS-CoV2 (COVID-19)

<https://en.wikipedia.org/wiki/Coronaviridae>

<https://translational-medicine.biomedcentral.com/articles/10.1186/s12967-020-02534-2>



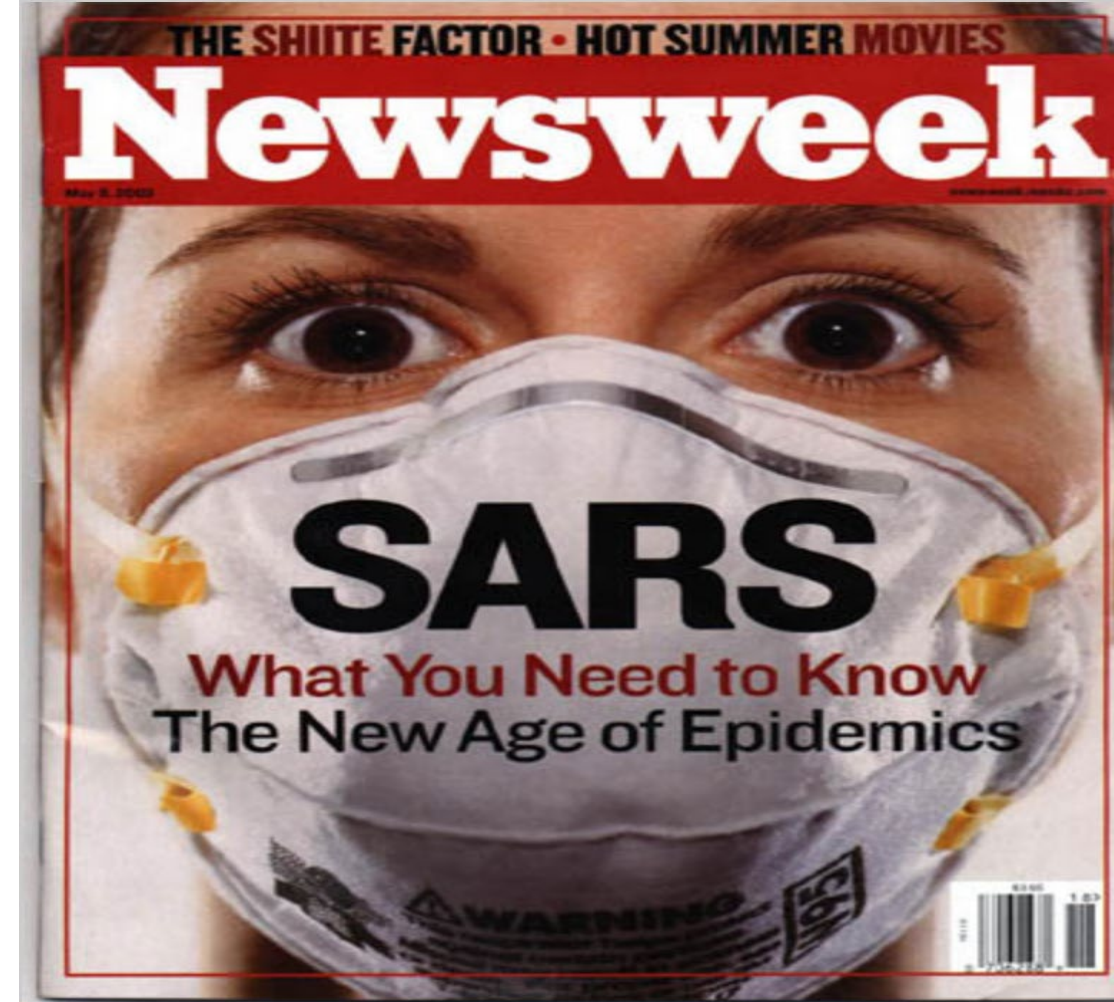
Coronaviridae

- Cause respiratory infections in humans
 - Range from common largely mild cold but several species may be fatal
- Chickens- upper respiratory disease
- Cows/Pigs – Diarrhea
- Other than COVID-19 no vaccines or antivirals exist.

SARS-CoV

- Originally identified in Southern China 2002, global threat 2003
- 2-7 days after illness onset dry cough with progression to hypoxia. +/- GI distress. Transition to pneumonia likely.
- Contagious at the onset of symptoms, most contagious in second week of illness. No cases associated with asymptomatic/presymptomatic patients
- Infection Prevention Measures: Standard, Contact, Airborne Isolation precautions
- Global outbreak- 8 months. 8,100 people infected. 774 deaths.
 - USA- 8 lab confirmed SARS cases, all travel associated

<https://www.cdc.gov/sars/index.html>





Side Bar-Isolation PPE

COVID-19 Personal Protective Equipment (PPE) for Healthcare Personnel

Preferred PPE – Use N95 or Higher Respirator



© 2020 CDC

cdc.gov/COVID19

Side Bar- Isolation Air Flow

AIJ ROOM



OPTION 1.

COMPLIANT W/ CDC, ASHRAE, FGI

OPTION 2.

IN ROOM HEPA, DISCHARGING DIRECTLY TO EXTERIOR.



OPTION 3.

IN ROOM FAN (NON-HEPA) DISCHARGING DIRECTLY TO EXTERIOR -OR- USE EXISTING TLT ROOM EXHAUST.



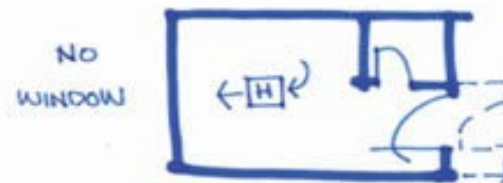
OPTION 4.

IN ROOM HEPA DISCHARGING TO RETURN. MUST BALANCE SYSTEM TO PREVENT DOWN STREAM EFFECTS



OPTION 5.

HEPA UNIT SCRUBS AIR FROM ROOM AND DISCHARGES TO CORRIDOR. NEED TO RELIEVE PRESSURE FROM CORRIDOR.



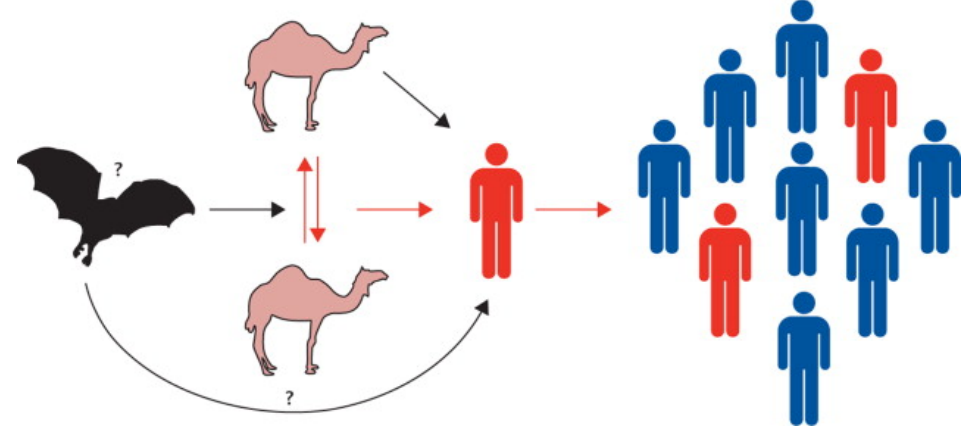
OPTION 6.

HEPA UNIT RECIRCULATES AIR IN ROOM AFTER SCRUBBING. NOT NEGATIVE, SUPPLY SHOULD BE COVERED TO PREVENT + PRESSURE.

* RETURNS SHOULD BE COVERED IN ALL OPTIONS (EXCEPT #1)

* MAINTAIN 25' DISTANCE FROM FINAL DISCHARGE POINT & OPENINGS INTO BUILDING.

MERS-CoV



- Identified in Saudi Arabia in 2012
- Likely an animal source, found in camels though not definitive transmission direction.
- Illness onset 5-6 days after exposure
- Symptoms: Fever, cough, shortness of breath. Less likely were diarrhea and vomiting.
- Infection Prevention measures: Standard, Contact, Airborne Isolation precautions
- Global Outbreak: 8 years (10/2012—3/2020).
 - 2521 cases. 866 deaths. 27 countries Largely linked to the Arabian Peninsula with outbreaks (186 cases/38 deaths) occurring in South Korea as well. 2 travel related cases in USA
 - S. Korea outbreak traveler visited 4 hospitals. 3 of subsequent 34 cases visited 5 hospitals...



SARS-CoV2 (COVID-19)

- Identified in Wuhan Providence in China, November 2019
- Likely a bat origin for this virus but it is still unknown.
- Symptoms: cough, loss of sense of taste/smell, shortness of breath, diarrhea, headache, etc
- Infection Prevention measures*: Standard, Contact, Droplet (with eye protection) Isolation precautions
 - Airborne (respirator with air flow changes) recommended for certain procedures/activities
- Ongoing Global Outbreak. 142M cases, 3M deaths. USA 31.6M cases, 565,613 deaths.

<https://covid19.who.int/>

https://covid.cdc.gov/covid-data-tracker/#cases_casesper100klast7days

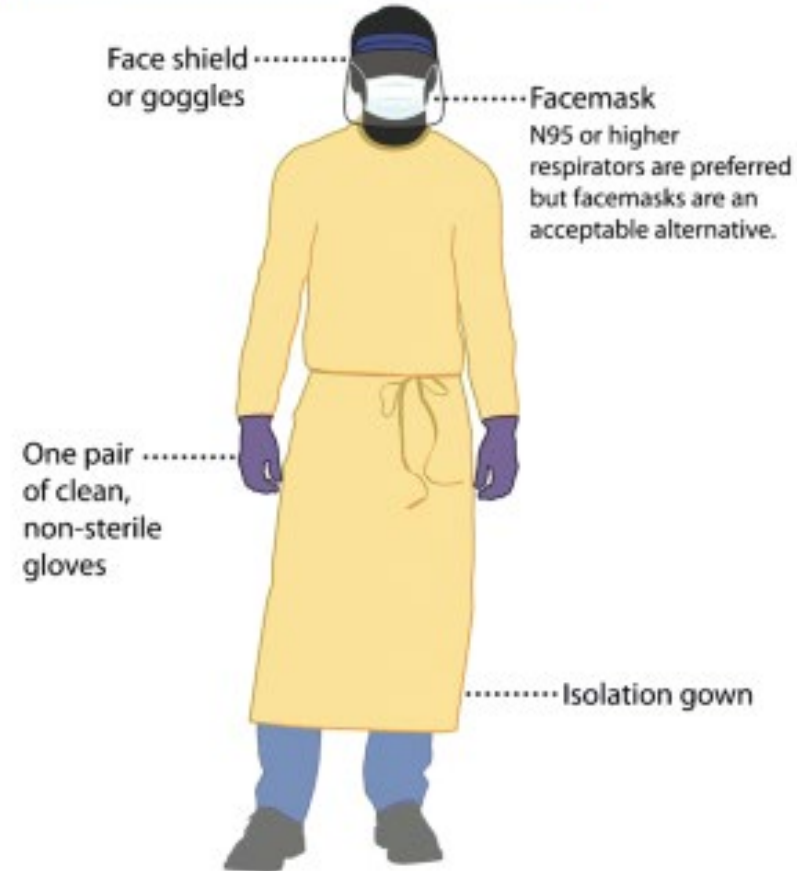
<https://www.cdc.gov/coronavirus/2019-nCoV/hcp/index.html>

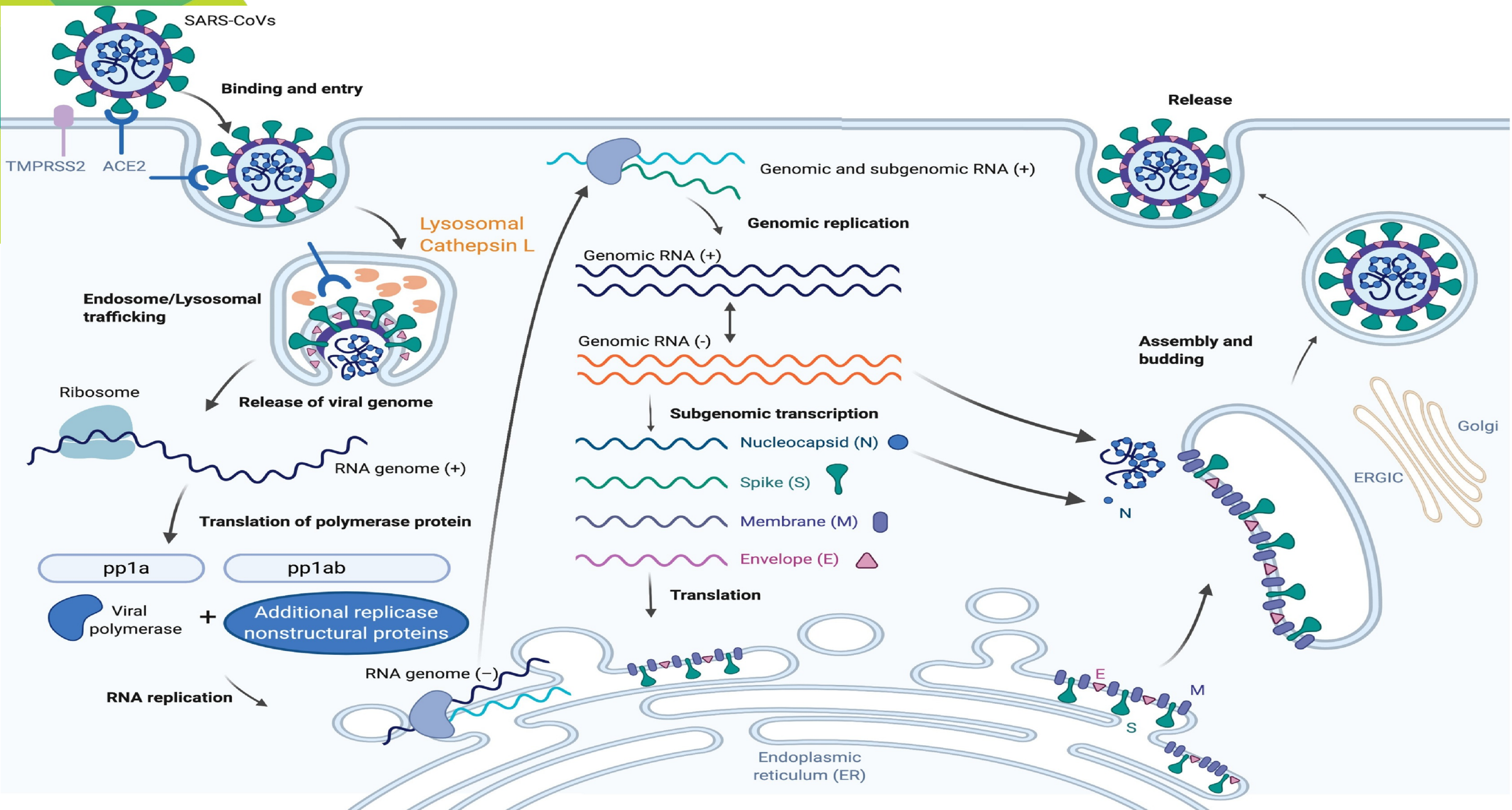
COVID-19 Personal Protective Equipment (PPE) for Healthcare Personnel

Preferred PPE – Use N95 or Higher Respirator

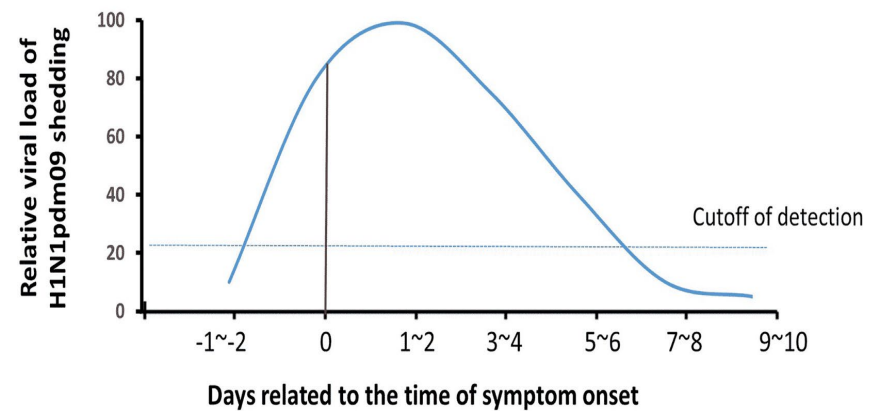
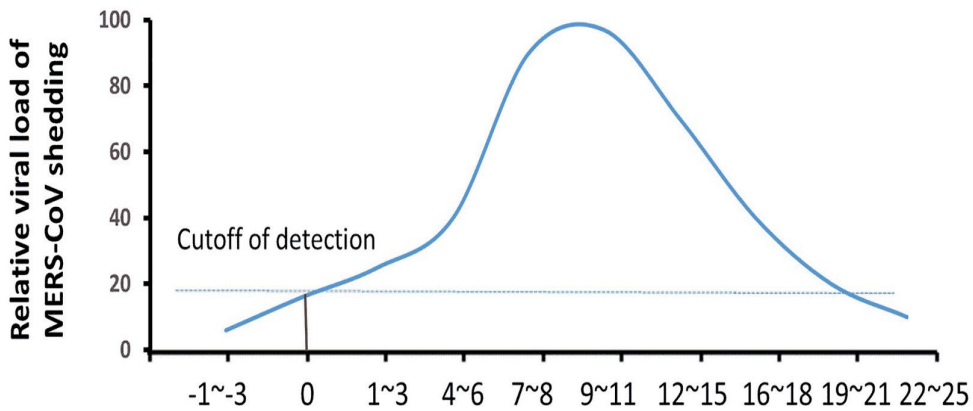
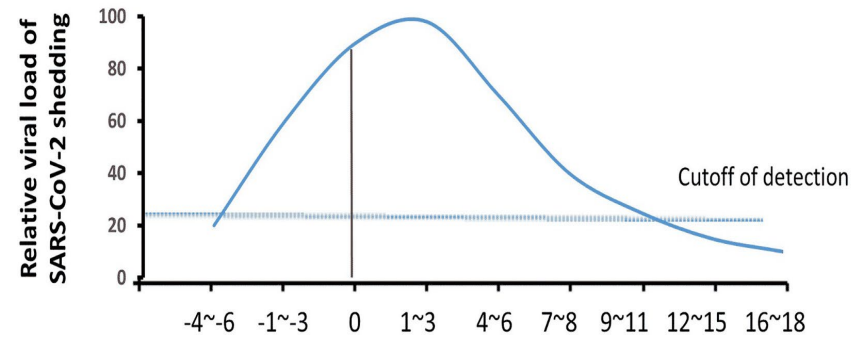
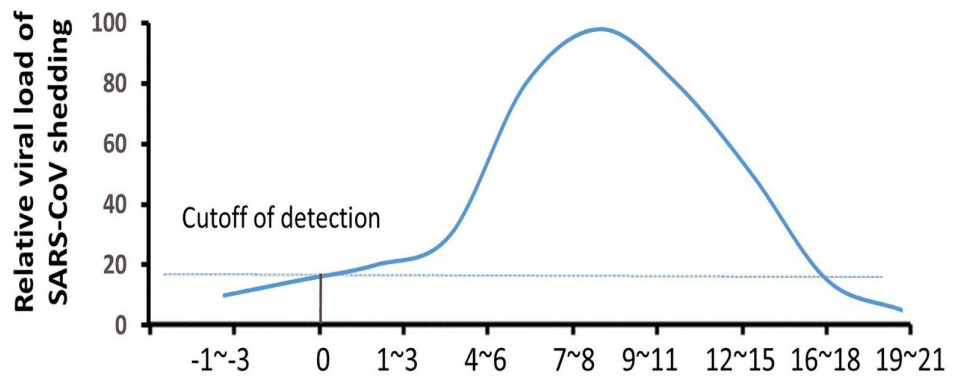


Acceptable Alternative PPE – Use Facemask





The unique features of SARS-CoV-2 transmission: Comparison with SARS-CoV, MERS-CoV and 2009 H1N1 pandemic influenza virus



<https://onlinelibrary.wiley.com/doi/full/10.1002/rmv.2171>



Countries impacted by COVID-19

As of Jan. 20: **4**



As of Feb. 15: **28**



As of Mar. 1: **66**

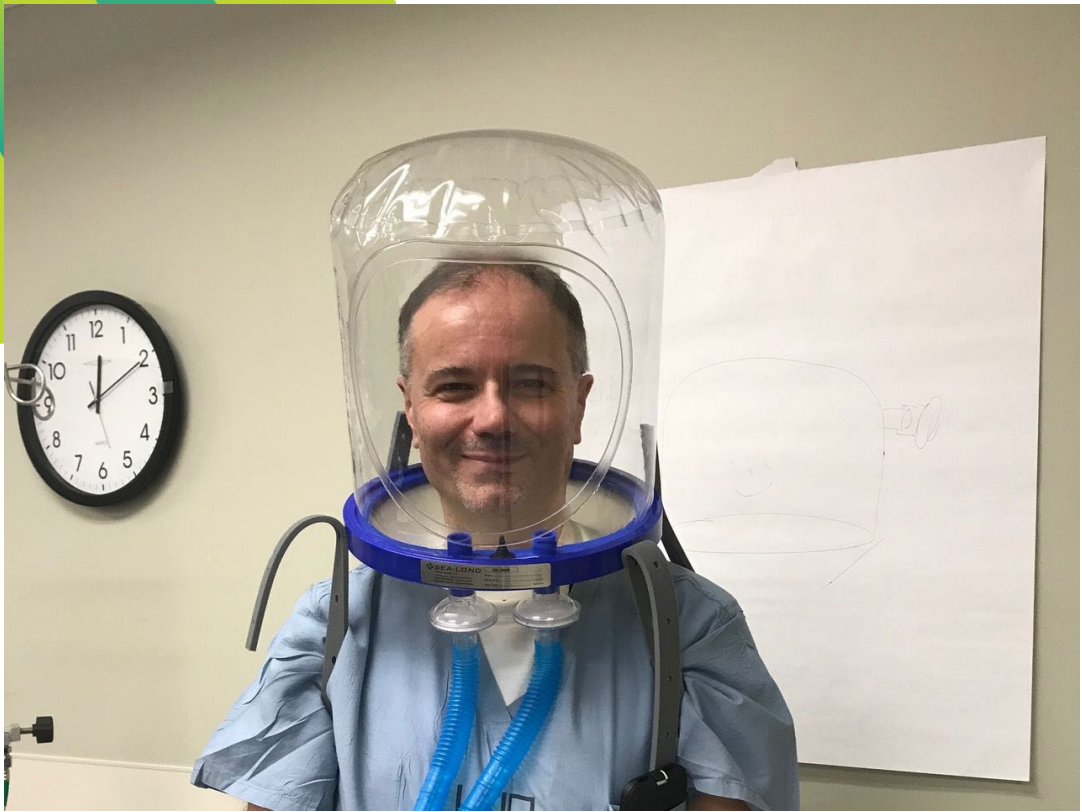


As of Mar. 20: **165**





ONE YEAR LATER...



Scary scenes we never thought we'd see



But it brought out the best in our caregivers

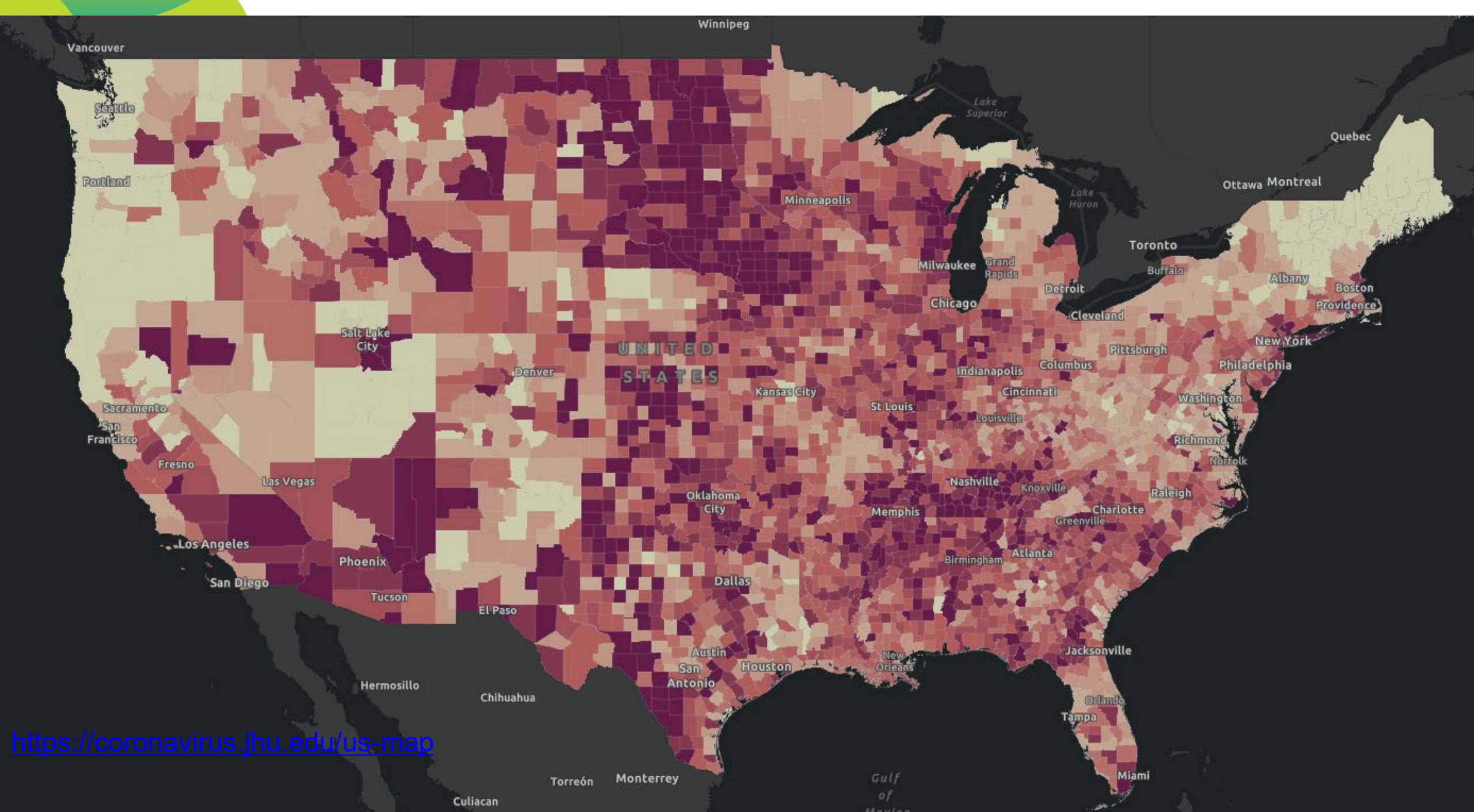




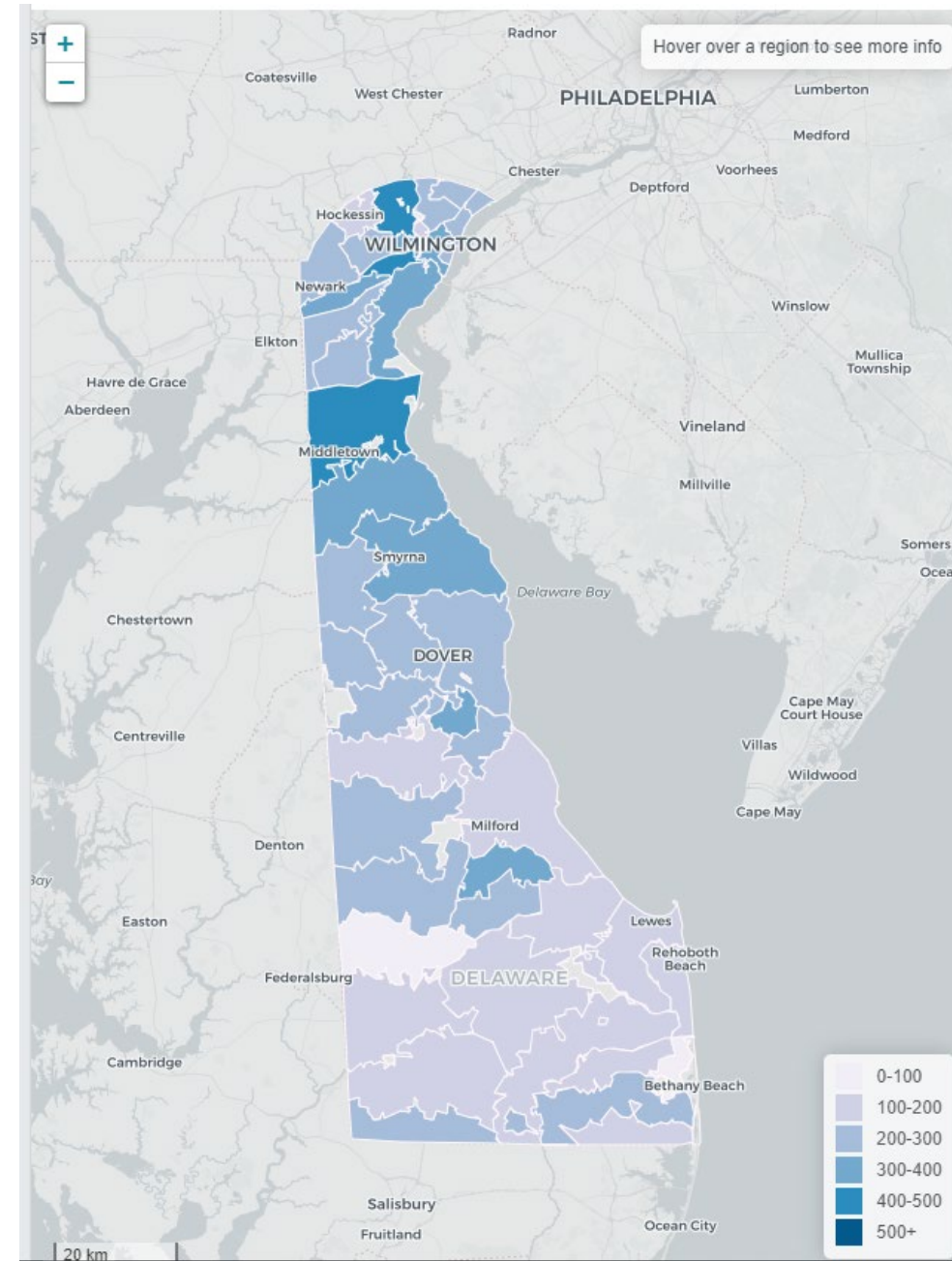
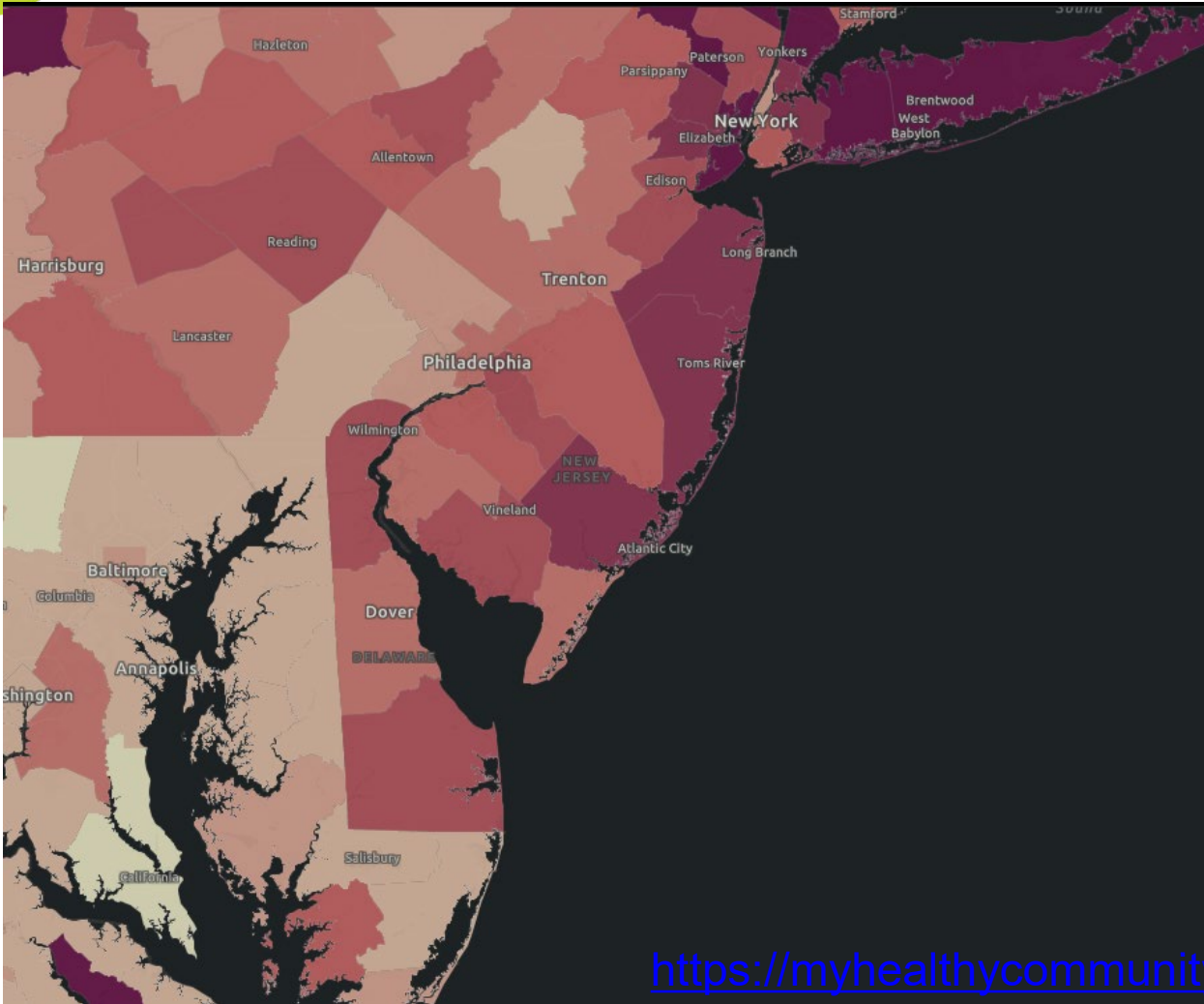
In Dr. Fauci we trust



Dr. Drees we follow!



<https://coronavirus.jhu.edu/us-map>



<https://myhealthycommunity.dhss.delaware.gov/locations/stat>

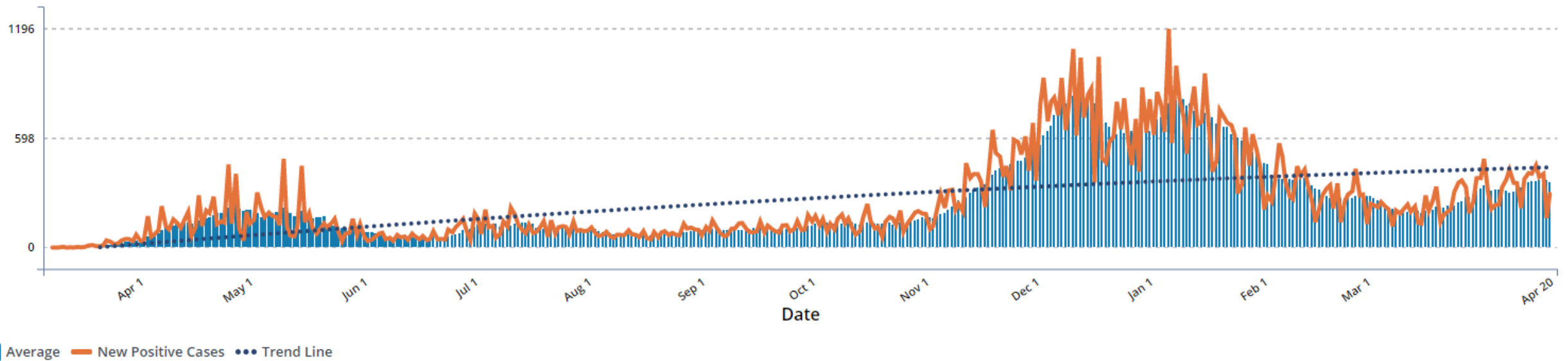


Delaware COVID experience

STATE OF DELAWARE

New Positive Cases

Data are current as of 6pm the previous day. Last update: 04/21/2021



https://myhealthycommunity.dhss.delaware.gov/locations/state/days_to_show/409/primary_trend_type/bar#overview_trends

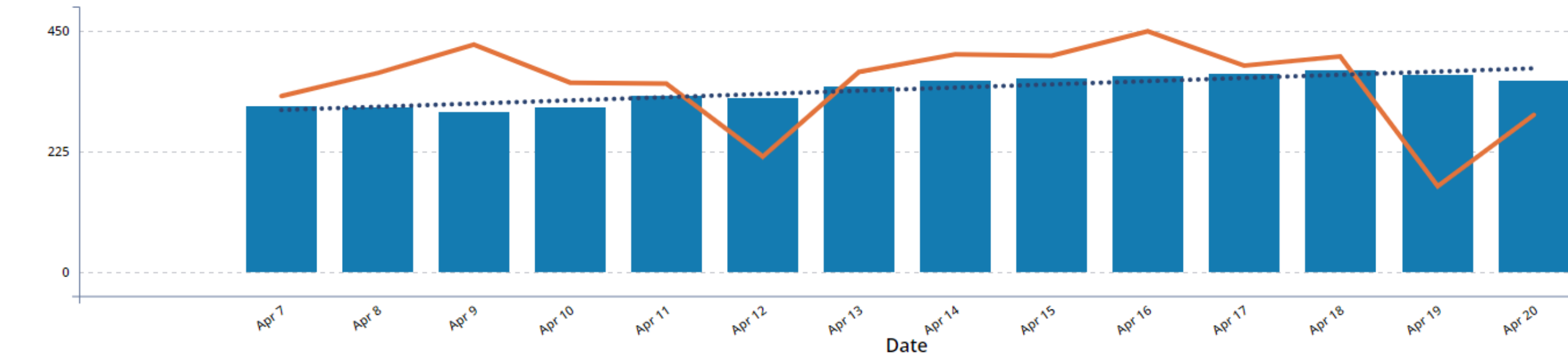


Delaware Recent COVID experience

STATE OF DELAWARE

New Positive Cases

Data are current as of 6pm the previous day. Last update: 04/21/2021



■ Average ■ New Positive Cases ●●● Trend Line



TREATMENTS/VACCINES



Treatments- at a glance*

- Hydroxychloroquine - No efficacy found and +/- impact on mortality
 - suggested as tx 4/29/20,
 - June 15 EUA withdrawn.
- Azithromycin- provides no benefit for severe covid
- Zinc- recommend against doses larger than dietary allowance
- Remdesivir- approved for hospitalized patients
- Bamlanivimab and etesevimab /Bam and imdevimab monoclonal antibody, outpatient therapy
- Convalescent plasma- not enough data to recommend
- Corticosteroids- specific situations where this applies

<https://www.covid19treatmentguidelines.nih.gov/>

<https://www.beckershospitalreview.com/pharmacy/an-updated-timeline-on->

Prophylactic treatment

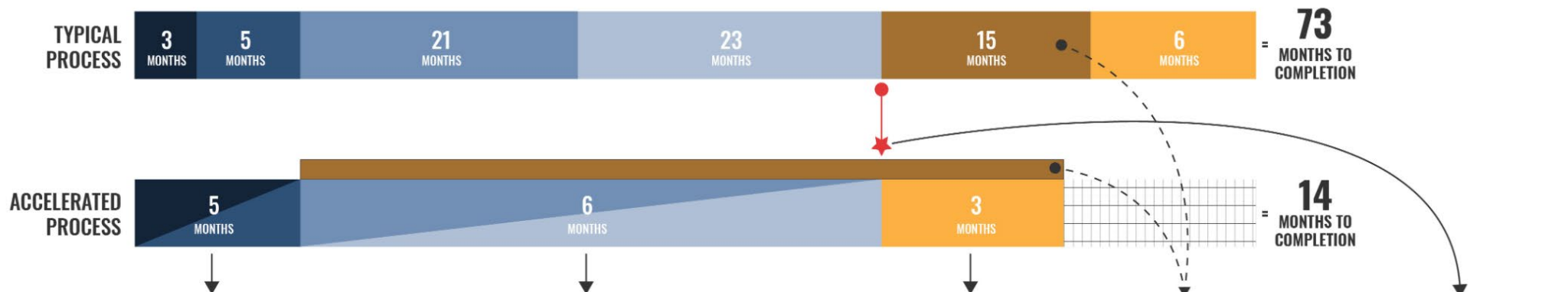
- Vaccines have shown to reduce
- No Prophylactic treatment, outside of vaccination, is recommended to prevent COVID-19 infection





OPERATION WARP SPEED Accelerated Vaccine Process

MISSION: Deliver 300 million doses of safe and effective vaccine by 1 January 2021.



1
A typical 8-month process is accelerated by:

- Creating vaccine candidates immediately after viral genome sequence is available.
- Using vaccine platforms developed for other diseases.

2
A typical 42-month process is accelerated by:

- Large scale Phase III clinical trials of 30,000 volunteers allowing for rapid collection and earlier analysis of safety and efficacy data of demographically diverse populations by the FDA, reducing the typical 12-month approval process to three months.
- Two promising candidates began Phase III clinical trials in July, with others to follow quickly in coming months. Before beginning Phase III, candidates must show safety data from animal and human studies.
- The U.S. Government funding at-risk, large-scale manufacturing of the most promising vaccine candidates during Phase III clinical trials to ensure any vaccine proven to be safe and effective is available immediately upon FDA Emergency Use Authorization (EUA) approval or licensure.

4
A typical 6-month process is accelerated by:

- A tiered approach based on CDC recommended allocation methodology used as part of pandemic flu planning and the COVID-19 response will be used to determine vaccine distribution.

3
A typical 15-month process is accelerated by:

- Planning for infrastructure and distribution before the vaccines are approved or authorized.
- CDC leading distribution planning with DoD augmentation.

5
A typical 12-month FDA review for EUA approval or licensure is accelerated by:

- Providing continuous safety and efficacy data collected in large Phase III clinical trials.

R&D + Preclinical Trials Vaccine Candidate/s Identified
 Phase II Clinical Trials
 Phase III Clinical Trials
 Manufacturing
 Distribution

<https://www.defense.gov/Explore/Spotlight/Corona>





Vaccines with active FDA EUA and ACIP recommendations

mRNA vaccines

- Pfizer BioNTech
 - 2 doses
 - Ultra cold storage, Multi dose vials, No preservative
- Moderna
 - 2 doses
 - Frozen/Cold storage, Multidose vials, No preservative

Virus vector vaccine

- Johnson and Johnson
 - 1 dose, no follow up
 - Refrigeration only (no freezing)
 - Multidose vials
 - No preservative

mRNA Vaccine history

- Development of mRNA therapy started 30 yrs ago
 - U of Wisconsin- worked in Mice 1990
 - Katalin Kariko, Upenn 2005, made it work in humans
- Moderna founded because of this discovery
 - Original idea pitched was to turn adult cells into embryonic stem cell research
 - Moderna pivoted to vaccine work in 2018
- BioNTech Started as immunotherapy
 - Cancer vaccines using mRNA

<https://www.statnews.com/2020/11/10/the-story-of-mrna-how-a-once-dismissed-idea-became-a-leading-technology-in-the-covid-vaccine-race/>

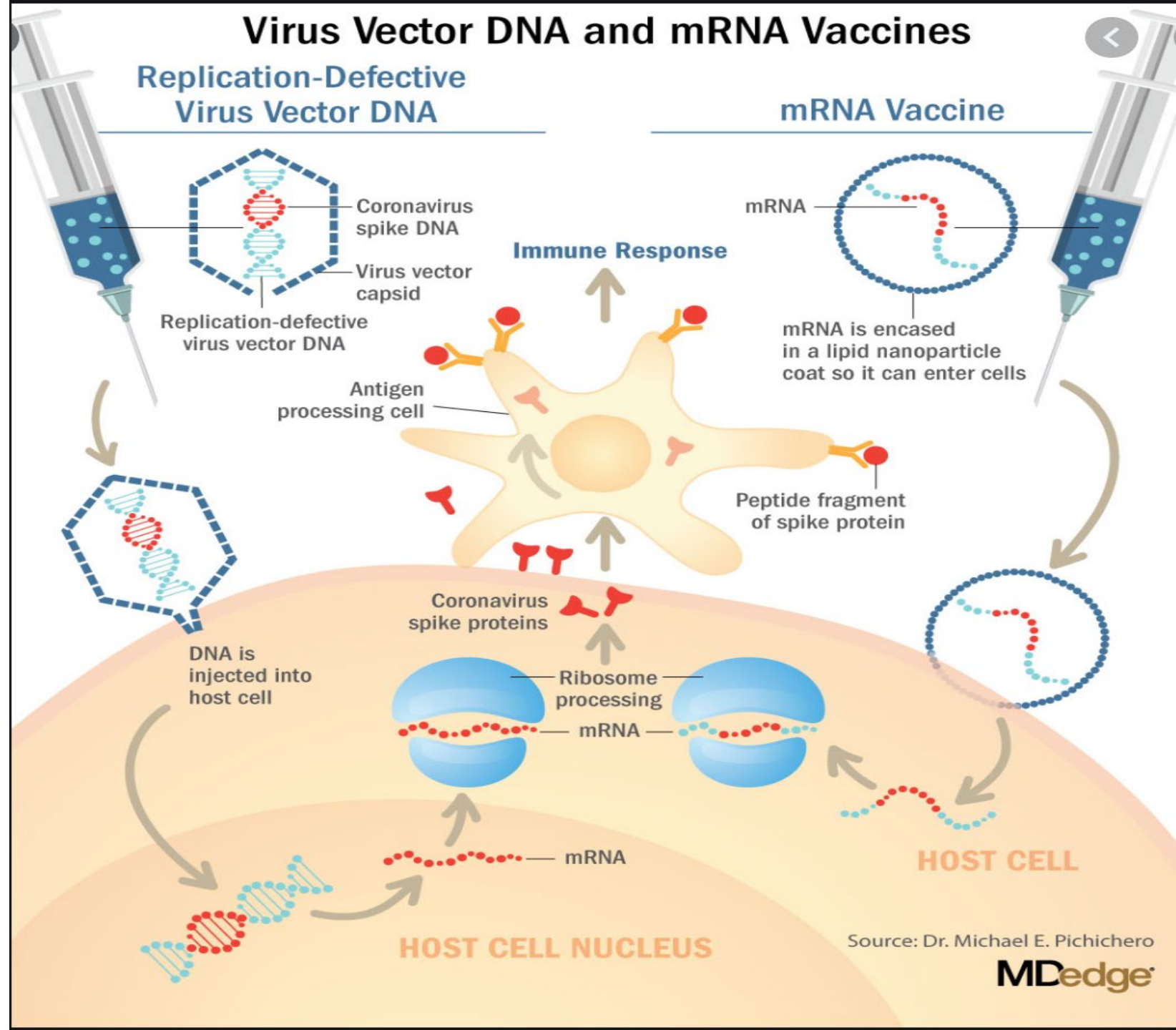




Viral Vector Vaccines

- Used since the 1970s
- Current licensed for use (Ebola Vaccine)
- Older technology
 - Using an altered virus that can't replicate
 - DNA that codes for RNA spike protein is injected into cell
 - Protein is synthesized by cell and released causing an immune respons

do
the
vaccines
work?



<https://www.mdedge.com/hematology-oncology/article/233491/coronavirus->



A word on J&J Pause

- Johnson and Johnson COVID Vaccine paused given reports of an adverse event
- Six cases of blood clots in 6.8M doses given since EUA. Blood clots, including CVST, appeared in 6-13 days after vaccine.
 - Important to weigh risks vs benefits on any new vaccine/drug
 - Relative risk is important too (while mechanism of action may be different)
 - Birth Control Pills 9/10,000 women DVT
 - COVID disease 20/513,284 CVST
- All vaccines reviewed by FDA and ACIP

<https://www.cdc.gov/vaccines/acip/index.html>

<https://www.health.com/condition/infectious-diseases/coronavirus/jj-vaccine-blood-clots-birth-control>



TRANSMISSION AND PREVENTION

<https://www.cdc.gov/coronavirus/mers/index.html>



Preventing COVID-19 today

- Masking

- Covers the nose and mouth
- Cloth or medical grade, several layers of breathable tightly woven material
- No gapping or valves
- A face shield is not a mask

- Physical distancing

- 6ft apart from those who don't live in your home
- Avoid close quarters or tight/cramped places

- Vaccination

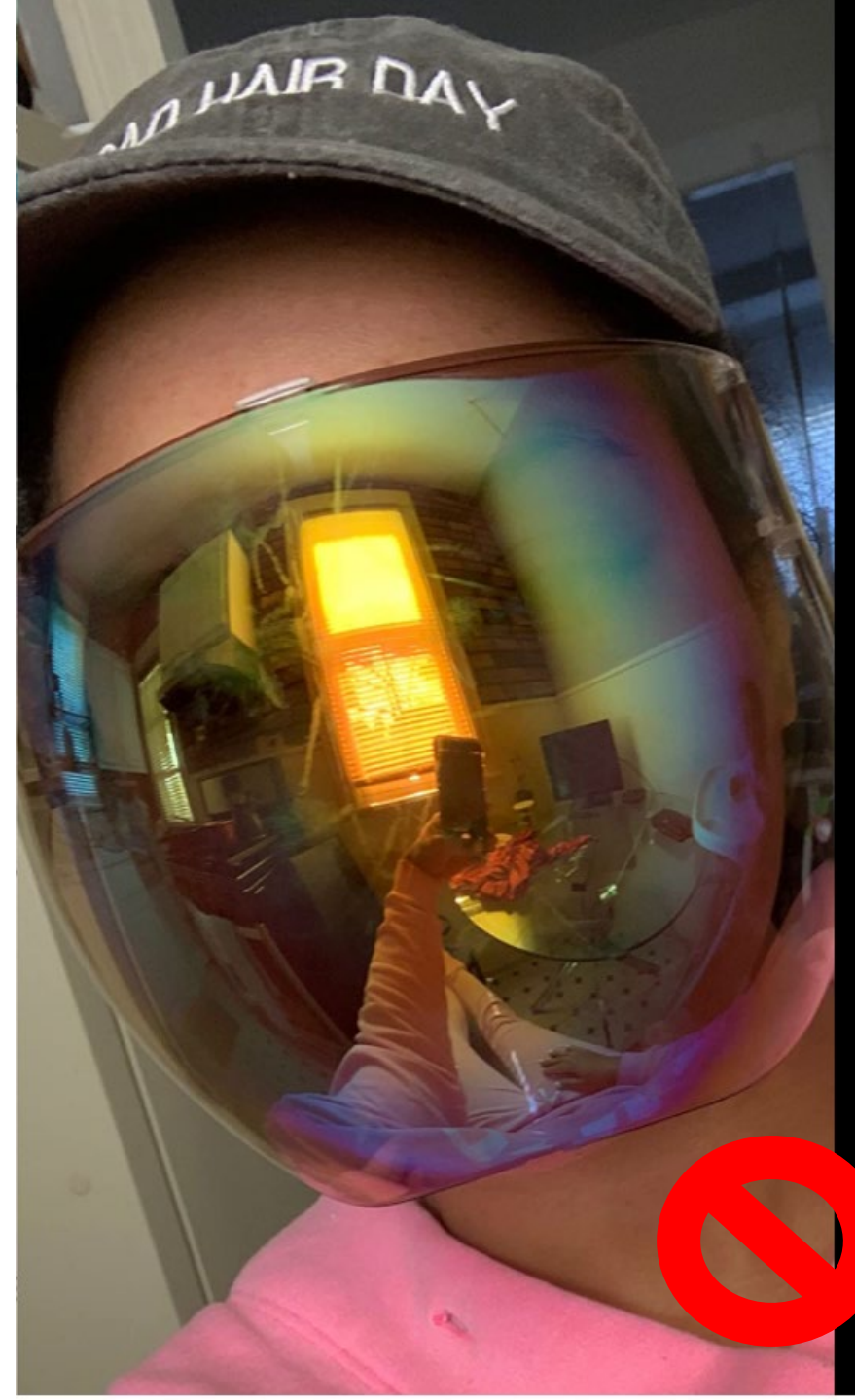
- Which ever brand is available
- Concerns? Speak with your primary physician

- Hand Hygiene

- 15-30 seconds soap/water
- Alcohol based hand sanitizer
- Often. How often? Even more often

Masking 101







A good mask should be tightly sealed around the nose and mouth. Boston Globe/Getty Images



Prevention

- No such thing as a Zero Risk Environment
- Important to understand how this virus is transmitted to understand risk
- Risk Management and Mitigation strategies going forward will aid in ending the pandemic

... But what puts me at risk?



Transmission

- COVID-19 is transmitted through the respiratory droplets of an infected person
 - The person may or may not have symptoms
 - The person may be close to you (within 6ft)
 - During certain activities the infected person can spread further than 6ft.
- Protection of your eyes, nose and mouth are of most importance in everyday activities. Especially those that involve close proximity indoors

<https://www.who.int/news-room/commentaries/detail/modes-of-transmission-of-virus-causing-covid-19-implications-for-ipc-precaution-recommendations>



COVID-19 Transmission risk

- Low risk of catching COVID- surfaces
 - Surface disinfection, while good, may not be helping as much as you think
- High Risk of Catching Covid- unmasked, indoor events with shouting/exercising
 - Bars, restaurants, gyms, airplanes,

<https://www.cdc.gov/coronavirus/2019-ncov/daily-life-coping/going-out.html>

COVID-19 Risk Index

Risk levels for exposure vary based on four main factors:



Enclosed space



Duration of interaction



Crowds

Density of people + challenges for social distancing



Forceful exhalation

Sneezing, yelling, singing, and coughing

Low

Walking outdoors
With or without pets

Running or biking
Alone or with another person

Risks: Close contact or potential clustering of people

Staying at home
Alone or with members of your household

Outdoor picnic or porch dining
With non-household people and physical distancing

Risks: Potential crowding and activity

Picking up takeout food, coffee, or groceries from stores

Risks: Potential crowding

When near people, wear a mask



Medium

Visiting hospital emergency department
Risks: Indoor, potential clustering of people

Medical office visit
Risks: Indoor, close contact, potential clustering of people, high-touch surfaces

Dentist appointment
Risks: Indoor, close contact, potential clustering of people, patient not wearing a mask

Taking a taxi or a ride-sharing service
Risks: Dependency on frequency of cleaning, duration of ride, and number of passengers

Museum
Risks: Indoor, close contact/potential clustering of people

Outdoor restaurant dining
Risks: Close contact, potential clustering of people, challenge to wear a mask during eating

Medium / High

Exercising at a gym
Risks: Indoor, close contact/ potential clustering of people, high-touch surfaces, difficult to wear a mask, high respiratory rate

Hair/nail salon and barbershops
Risks: Prolonged close contact, difficult to wear a mask

Working in an office
Risks: Indoor, high-touch surfaces, prolonged close contact/potential clustering of people

Indoor restaurant or coffee shop
Risks: Indoor, prolonged close contact/potential clustering of people, difficult to wear mask while eating and drinking

High

Bars and nightclubs
Risks: Enclosed space, prolonged close contact/potential clustering of people, high respiratory rate, yelling/projection of voice

Indoor party
Risks: Indoor, prolonged close contact/potential clustering of people
Additional risks: alcohol (loss of inhibition), shared joint/pipe (coughing)

Playing contact sports
Football, basketball, soccer, etc.
Risks: Prolonged close contact/potential clustering of people, high respiratory rate, unable to wear a mask

Public transportation
Subway or bus
Risks: Enclosed space, prolonged close contact/potential clustering of people, and high-touch surfaces

Religious services
Risks: Enclosed space, prolonged close contact/potential clustering of people, high-touch surfaces, singing/projection of voice

Concert
Risks: Enclosed space, prolonged close contact/potential clustering of people, high-touch surfaces, yelling/projection of voice

Movie theater or live theater
Risks: Enclosed space, prolonged close contact/potential clustering of people, high-touch surfaces

Watching sports
Risks: Prolonged close contact/potential clustering of people, high-touch surfaces, yelling/projection of voice, enclosed space (if indoor)

REOPEN INTELLIGENTLY.
REOPEN SAFELY.



Balancing Risk of getting COVID-19

- Know the risk of you and those in your home/circle becoming seriously ill if you contract the virus
 - Household contacts are at high risk for contracting disease from someone in the home
 - Complications/Severe disease can be more likely with some comorbid condition (increased BMI)
- Manage your risk accordingly
 - High risk of complication consider activities on the lower end of the risk scale
 - Lower risk of complication should still consider minimizing risk

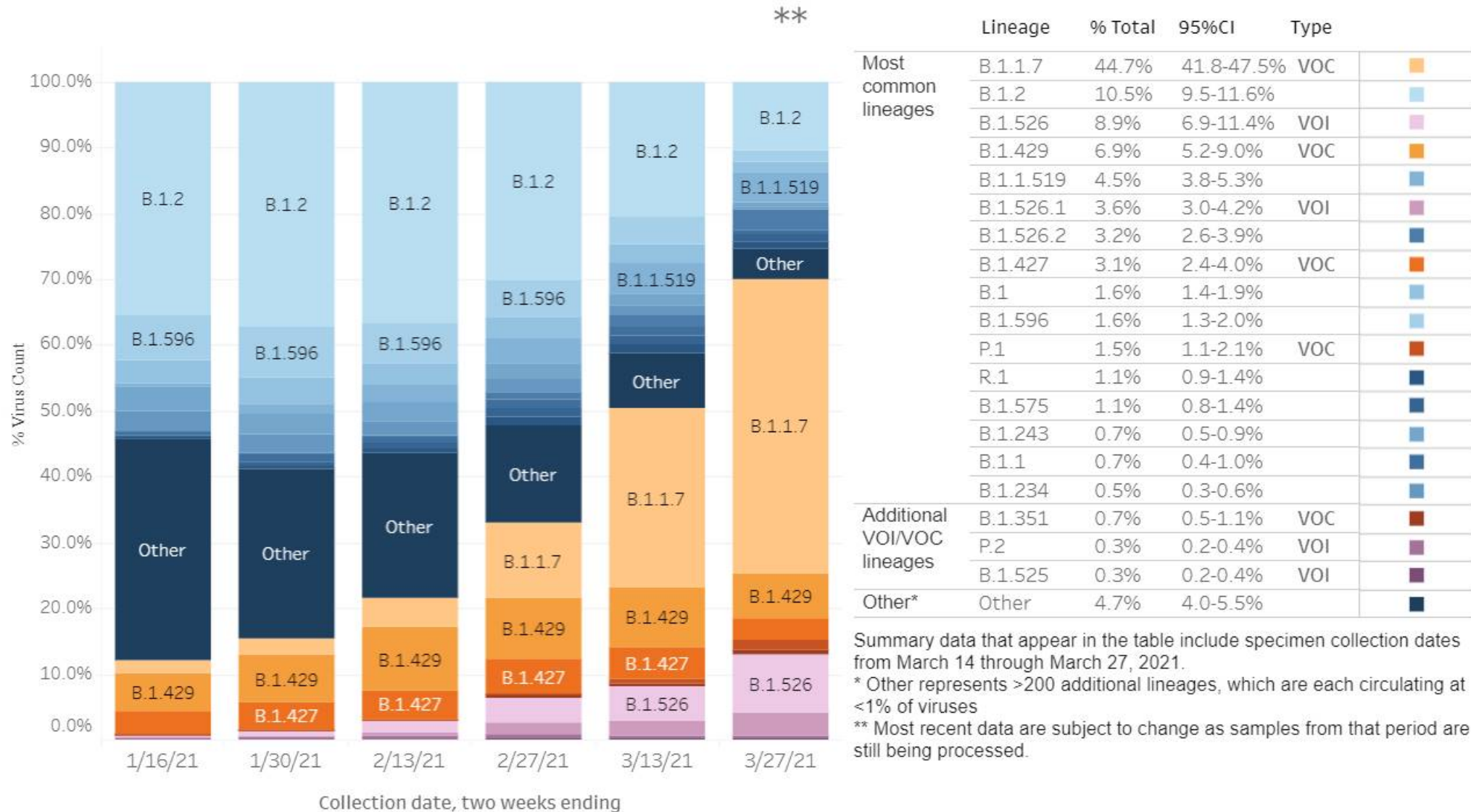


Variants

- Viruses constantly change, occasionally these changes lead to improved transmission/virulence
 - Current Variance of interest/concern
 - B.1.1.7 (UK)
 - B.1.351 (South Africa)
 - P.1. (Brazil)
 - B.1.427/B.1.429 (CA)
- Epidemiology of sequenced COVID19 cases in Delaware shows B.1.1.7. is one of a handful of variants circulating in our community.
- Currently variants are still controlled to a large extent through Masking, Social Distancing, Hand Hygiene and Vaccinations.

SARS-CoV-2 Variants Circulating in the United States

SARS-CoV-2 Variants Circulating in the United States, January 3 – March 27 2021



<https://covid.cdc.gov/covid-data-tracker/#variant-proportions>



Going forward

- I hesitate to express that I know what the future holds except that we will continue to learn. Treatments, vaccines, prevention. How to do it better
- Potential for COVID-19 vaccine boosters in the future depending on long term immunity prospects
- We saw almost zero flu cases this year. Maybe masking (specifically during flu season) will become normalized?
- Reduced capacity environments are becoming less and less common despite increasing case counts in some



It's for your own good. You have to stop touching your face.





