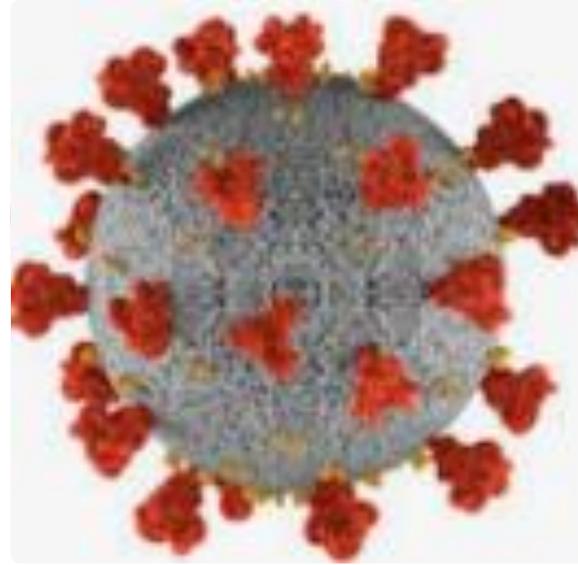




Covid-19 Update

The end of the pandemic?

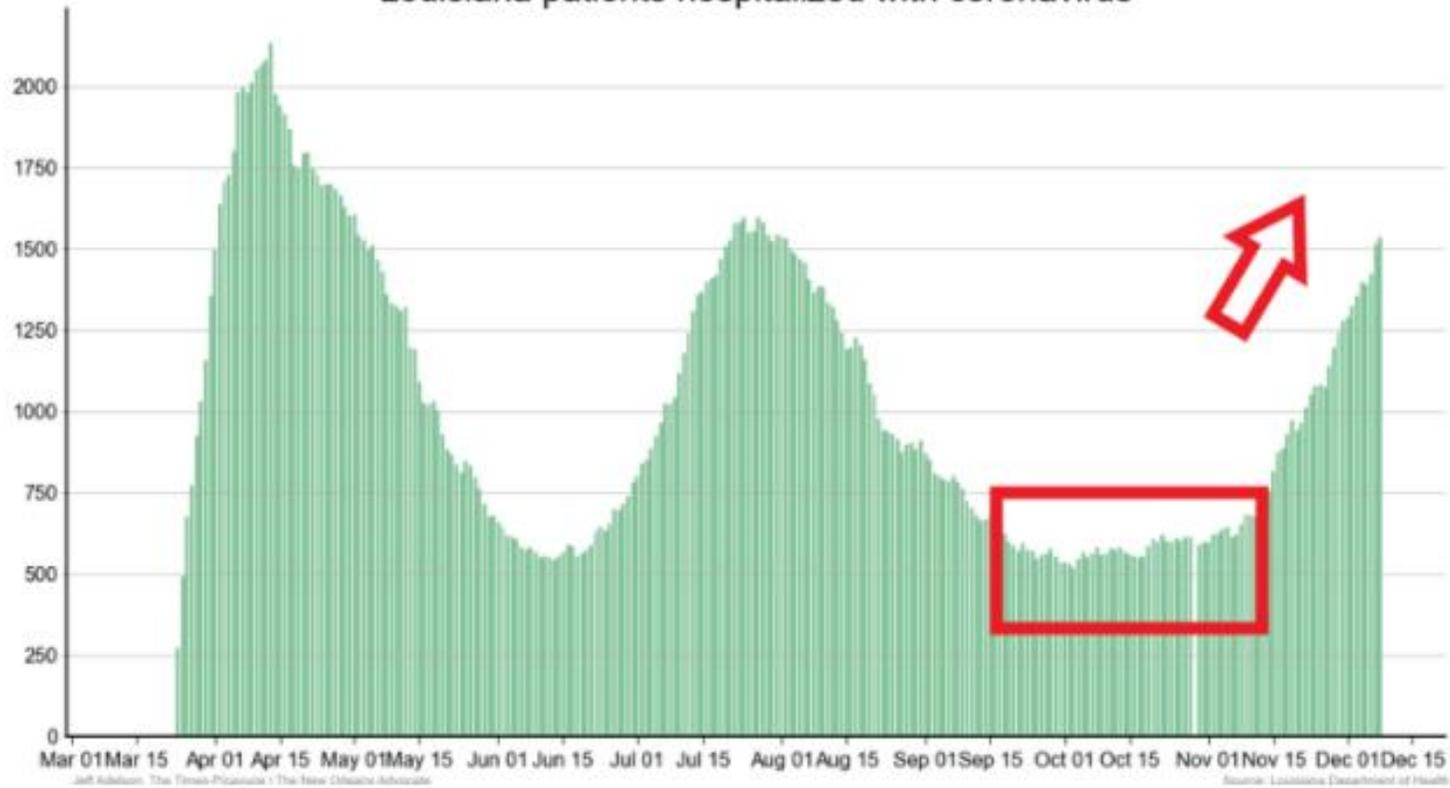
December 14, 2020



Agenda

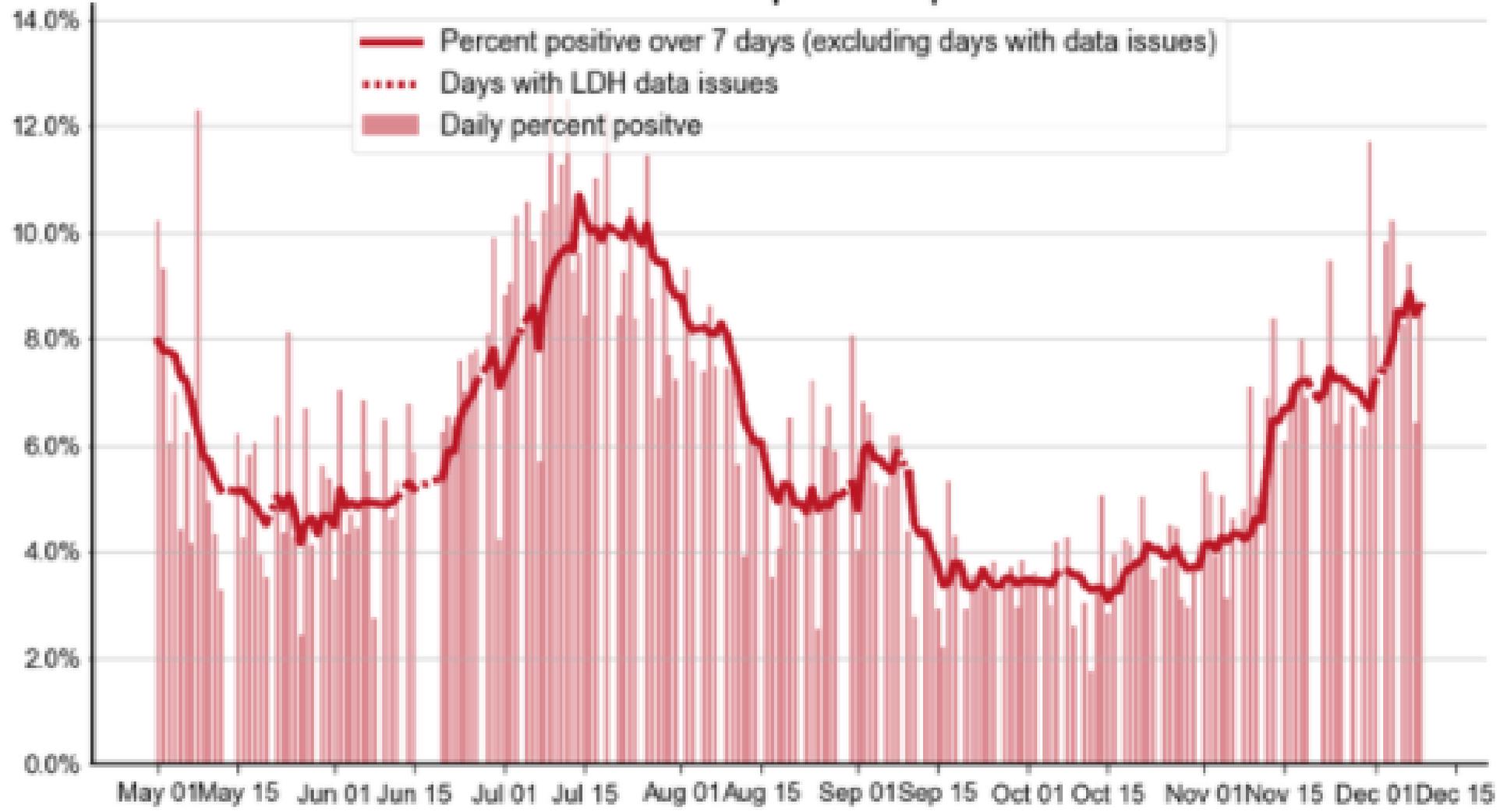
- I. Where are we now
- II. Prevention of viral spread
- III. Herd immunity
- IV. Immunity after infection
- V. Types of vaccines
- VI. Long haulers
- VII. Future state: Predictions

Louisiana patients hospitalized with coronavirus



Louisiana patients hospitalized with coronavirus

Louisiana coronavirus percent positive test rate

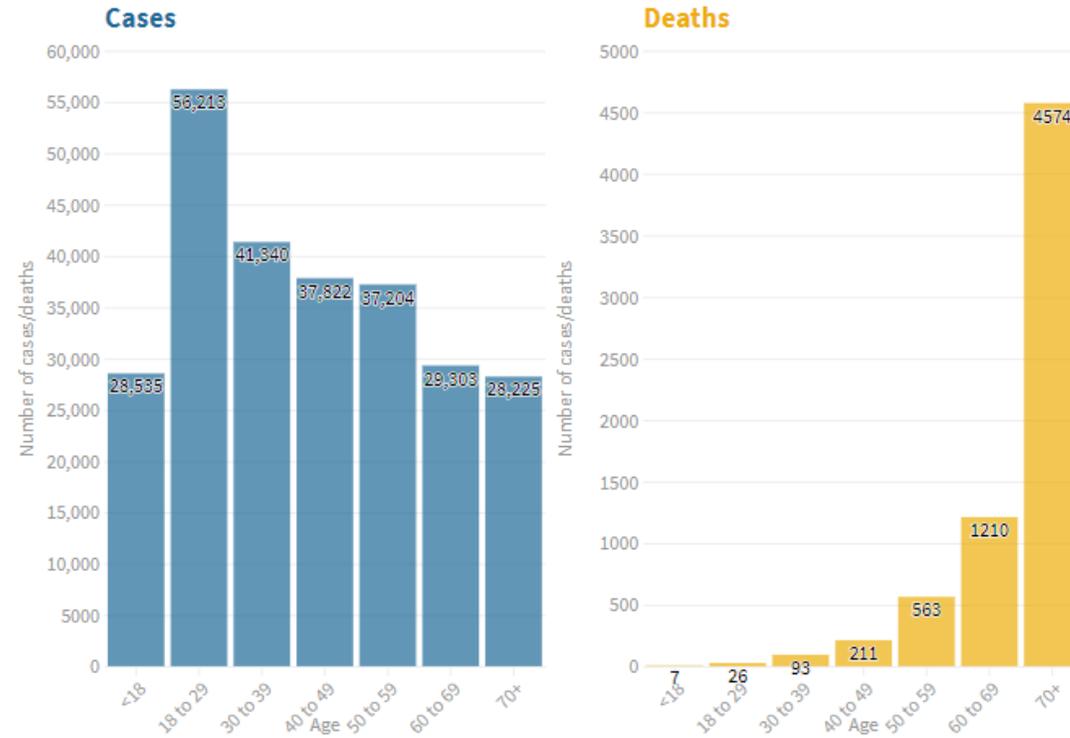


Jeff Adelson, The Times-Picayune | The New Orleans Advocate

Source: Louisiana Department of Health

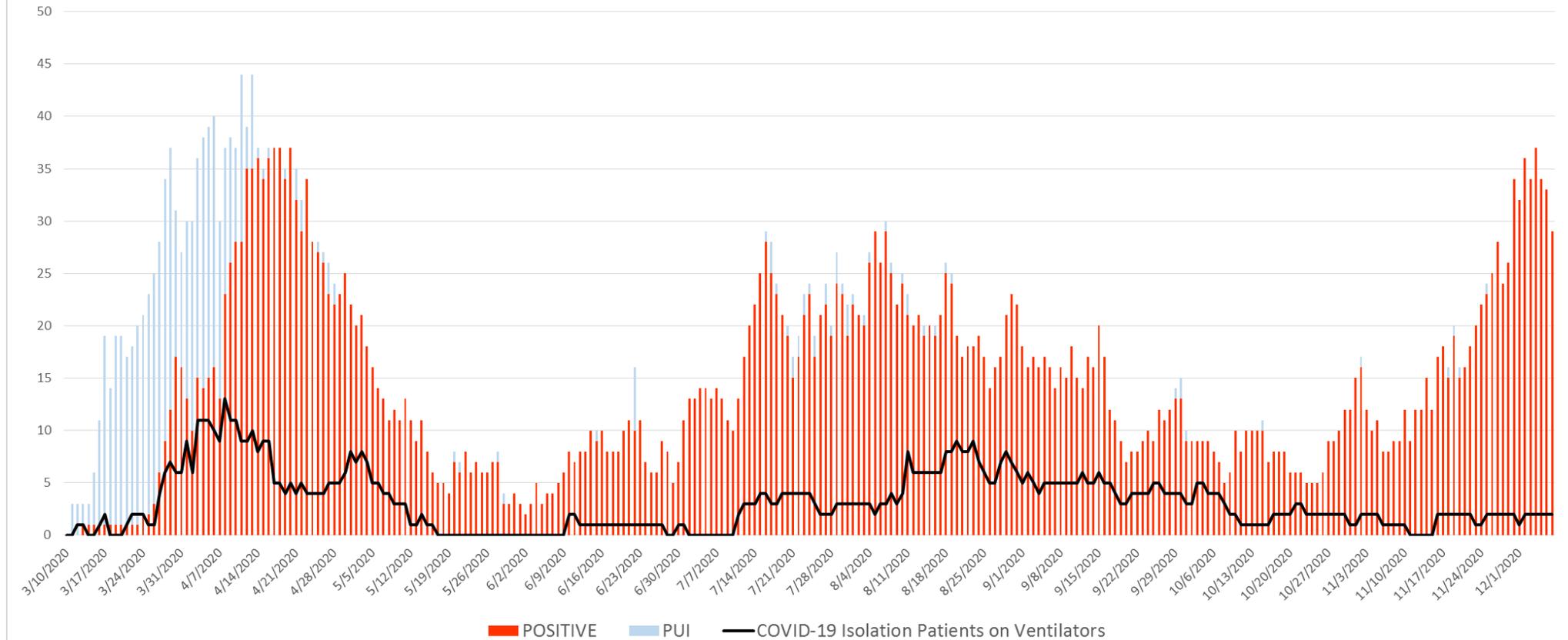
Age range of coronavirus patients

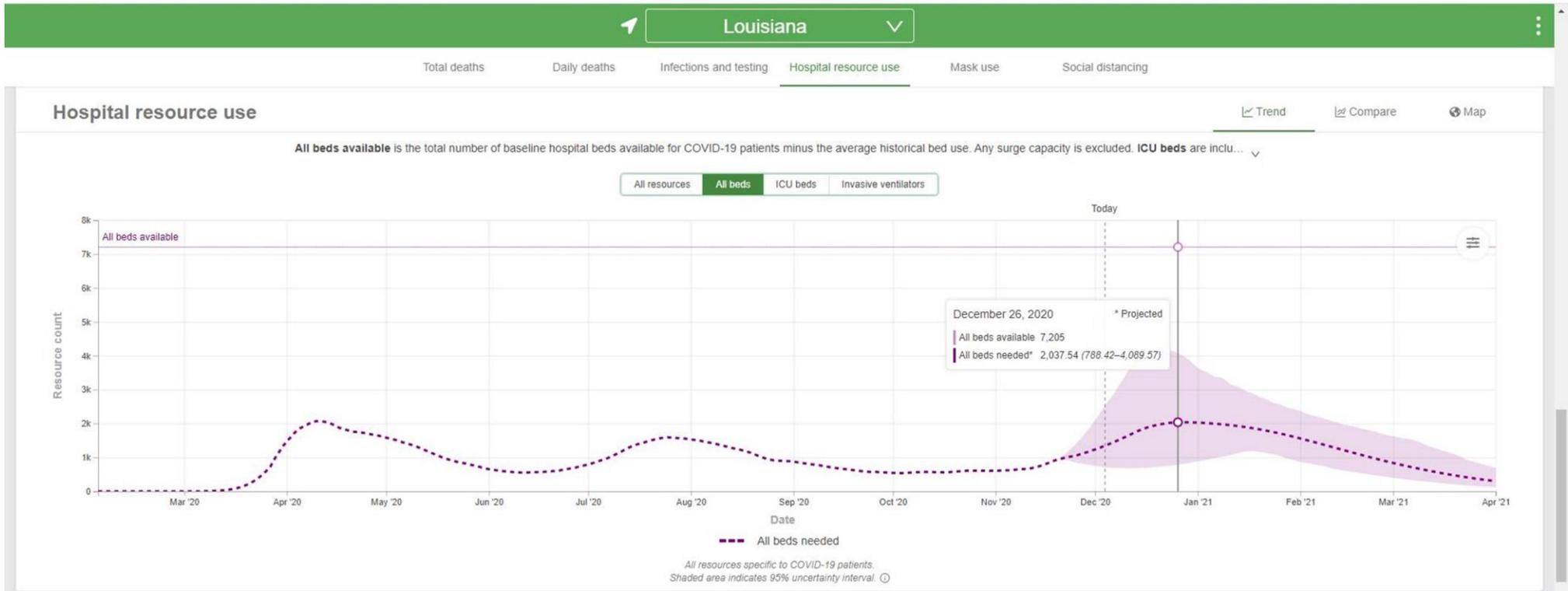
As of Dec. 9, there were 241,348 confirmed cases of coronavirus and 6,393 confirmed deaths reported in Louisiana.



Source: Louisiana Department of Health • Graphic created by Amie Just, The Times-Picayune | Advocate

ST. TAMMANY HEALTH SYSTEM COVID-19 INPATIENTS





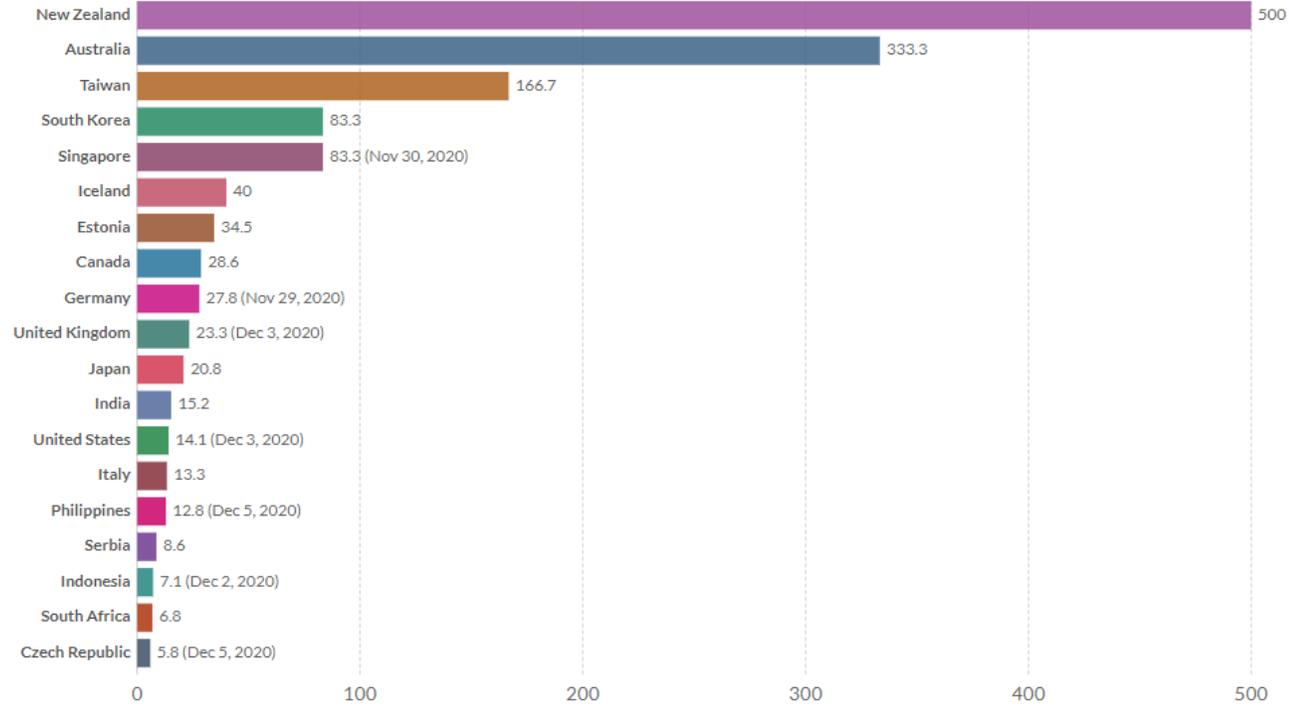
IHME Prediction Model

Total number of COVID-19 tests per confirmed case, Dec 6, 2020

The chart shows the average number of tests for each confirmed case across the whole outbreak.

Our World
in Data

[LINEAR](#) [LOG](#) [+ Add country](#)



[LINEAR](#) [LOG](#)

Source: Official data collated by Our World in Data; Johns Hopkins University CSSE

Note: Comparisons of testing data across countries are affected by differences in the way the data are reported. Details can be found at our [Testing Dataset](#) page.

OurWorldInData.org/coronavirus • CC BY

▶ Jan 22, 2020

○ Dec 6, 2020

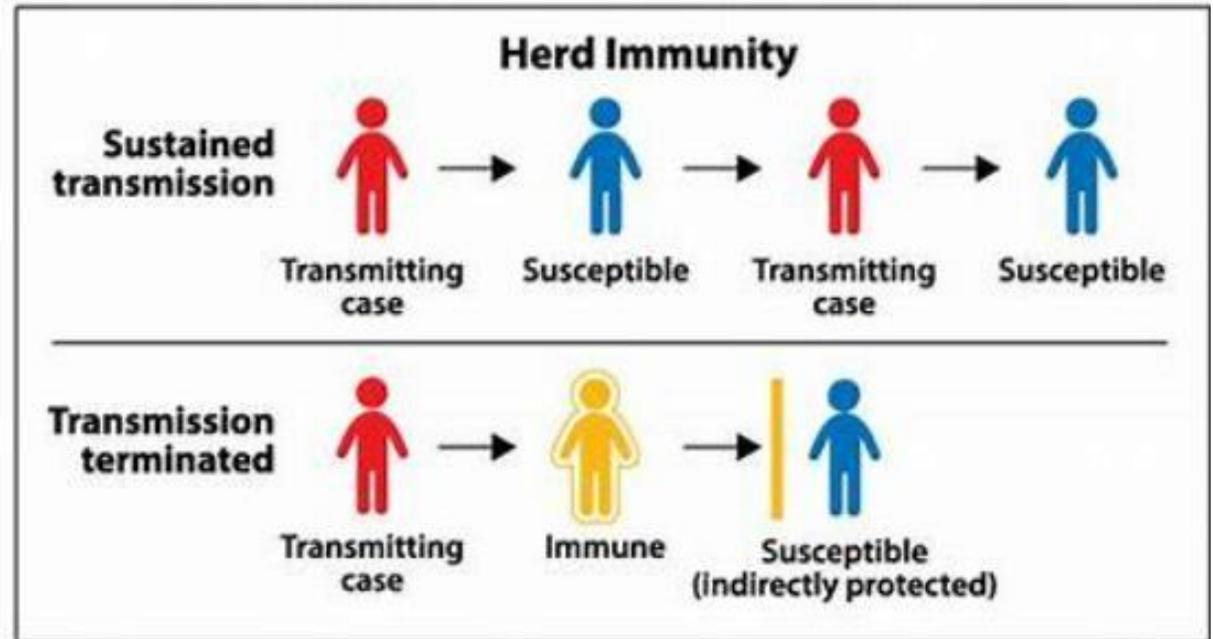
STHS pre-procedure Covid-19 testing policy

- Quarantine rules for Covid-19 exposure:
 - D/C quarantine at 7 days if no symptoms and negative PCR or antigen test
 - D/C quarantine at 10 days if no symptoms and no test is done
 - Continue to monitor for any symptoms for 14 days from exposure
- Cleared for procedure rules and positive Covid-19:
 - Hospitalized Covid-19 patients wait 20 days from signs/symptoms
 - Non-hospitalized for Covid-19 wait 10 days from signs/symptoms
 - Asymptomatic positive patients wait 10 days from test day

Herd Immunity

This is not the end, this is not even the beginning of the end, this is just perhaps the end of the beginning.”

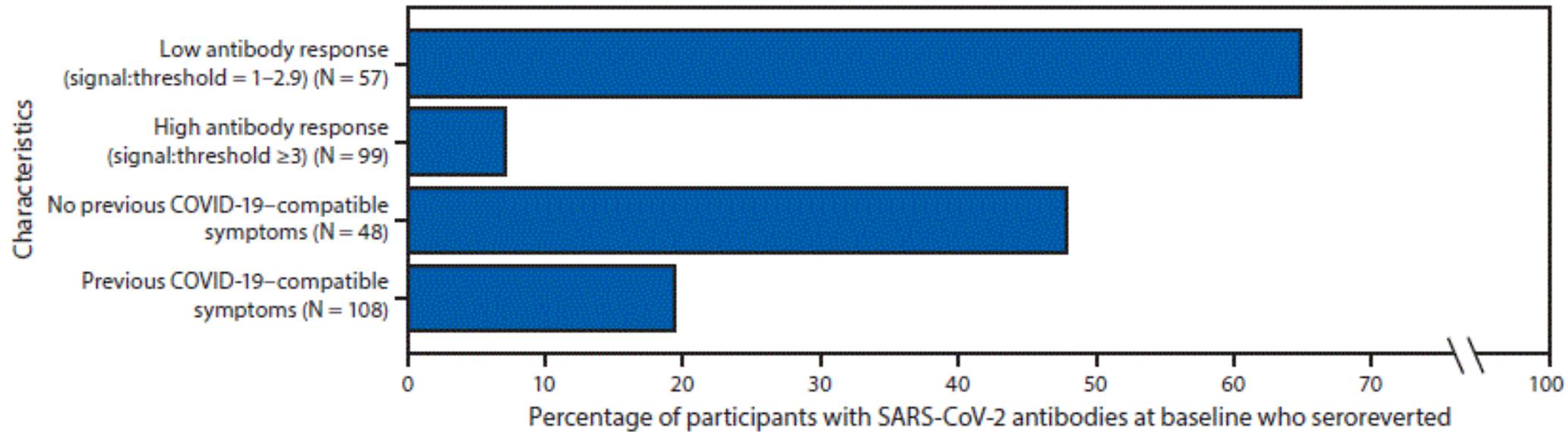
-Winston S. Churchill



Herd Immunity: the unknown immunity

- Do you develop immunity after infection?
- How long does immunity last?
- What is the percentage of infection in the population to achieve herd immunity?
- Does the virus mutate to negate herd immunity?

FIGURE. Percentage of 156 participants with SARS-COV-2 antibodies at baseline who seroreverted a baseline antibody response* and history of COVID-19-compatible symptoms before baseline testing centers, United States, 2020



Abbreviations: COVID-19 = coronavirus disease 2019; ELISA = enzyme-linked immunosorbent assay.

- MMWR/Nov 27,2020/69(47);1762-1766

Herd Immunity: what we know from 1918

- 1918 influenza pandemic: herd immunity took years
- Herd immunity curbs pandemics but does not eradicate them
- 2 years after the start of 1918 pandemic:
 - 500 million infections
 - 50 million deaths
- H1N1 still persists, not eradicated

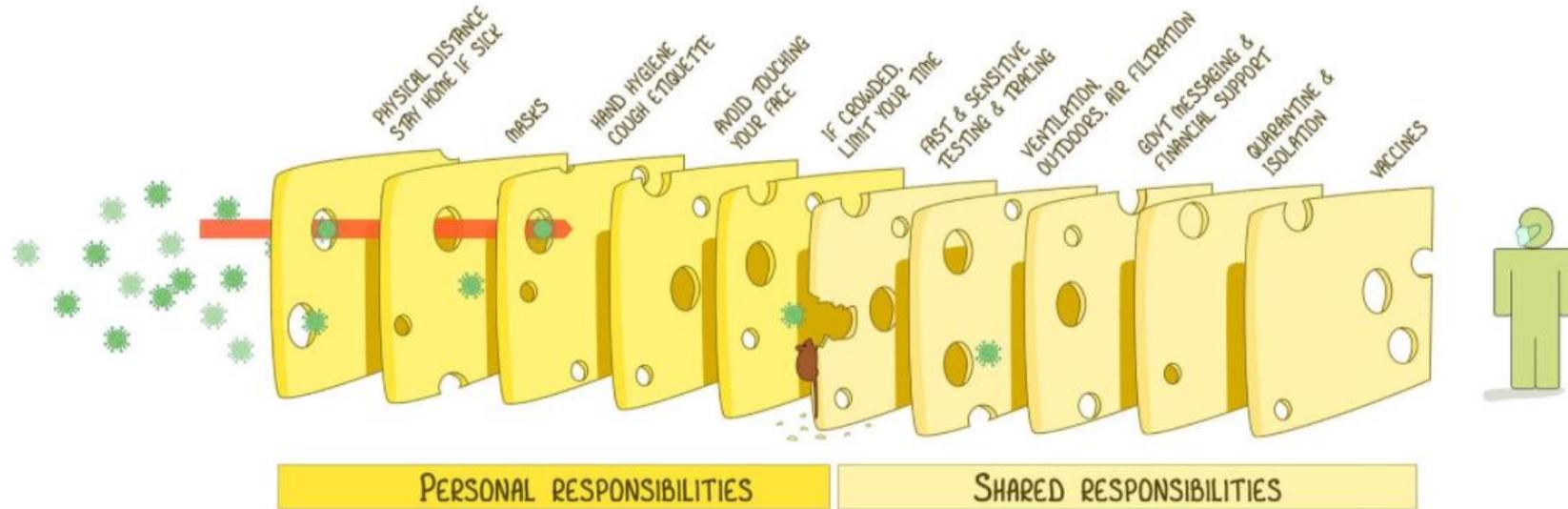
Herd Immunity: unlikely path

- Covid-19 spread estimated R_0 is 2-3.2
- 50-70% of population would need to be immune
- 60%=198 million immune for herd immunity to occur
- For natural herd immunity to occur (Swedish model) assume a 0.5% fatality rate=1 million deaths.
- Only 10% of U.S. population has been infected

Prevention of viral spread

THE SWISS CHEESE RESPIRATORY VIRUS PANDEMIC DEFENCE

RECOGNISING THAT NO SINGLE INTERVENTION IS PERFECT AT PREVENTING SPREAD



EACH INTERVENTION (LAYER) HAS IMPERFECTIONS (HOLES).
MULTIPLE LAYERS IMPROVE SUCCESS.

TAM M. TRACEY
VIOLOGYDOWNUNDER.COM
WITH THANKS TO JODY LAMARD, KATHERINE ARDEN & THE UNI OF QLD
BASED ON THE SWISS CHEESE MODEL OF ACCIDENT CAUSATION, BY JAMES T REASON, 1990
VERSION 3.0
UPDATE: 24OCT2020

Wearing masks reduces severity of disease

Decrease of inoculum may result in less severe disease

COVID hamster model related increased severity with increased inoculum

Case series shows increased asymptomatic cases with mask wearing

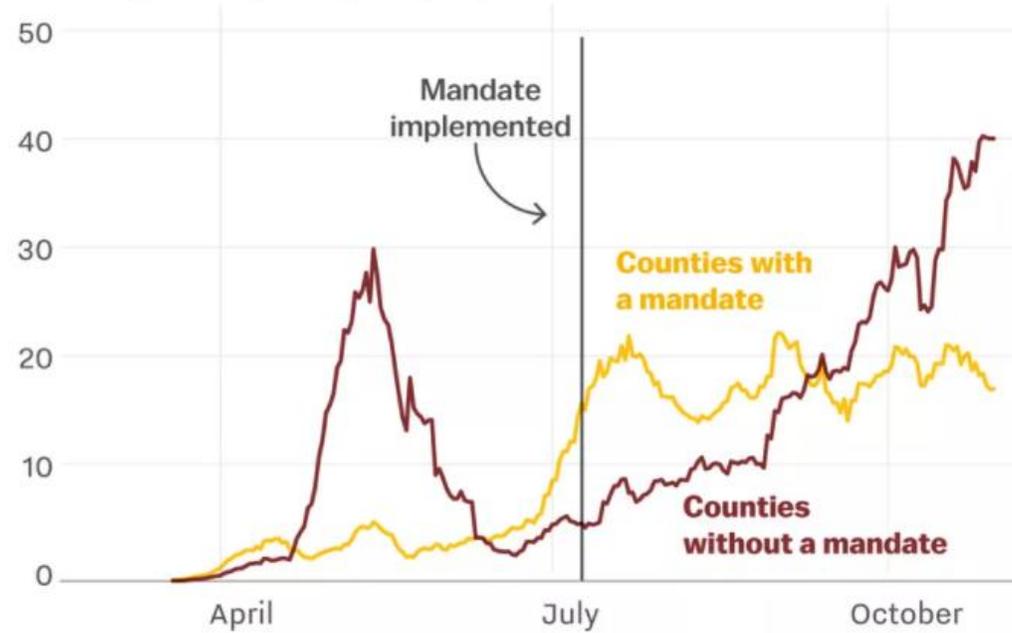
Cruise ship, Food plant, hospitals

Decrease in population death rates with masks



Without a statewide mandate, 21 Kansas counties implemented a mandate while the others opted out. Here is what happened next:

New daily cases per 100,000 people

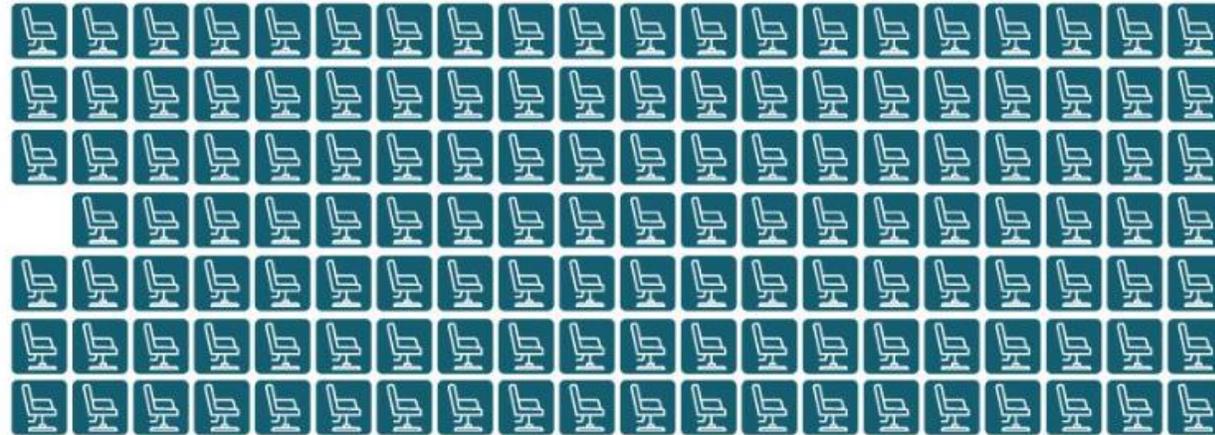


Source: Carlos Zambrana and Donna K. Ginther, University of Kansas

Vox

Two hair stylists with **COVID-19** spent at least 15 minutes with 139 clients

EVERYONE WORE FACE COVERINGS  **NO CLIENTS ARE KNOWN TO BE INFECTED***



WEAR CLOTH FACE COVERINGS CONSISTENTLY AND CORRECTLY TO SLOW THE SPREAD OF COVID-19

*No clients reported symptoms; all 67 customers tested had negative tests

[CDC.GOV](https://www.cdc.gov)

bit.ly/MMWR71420

MMWR

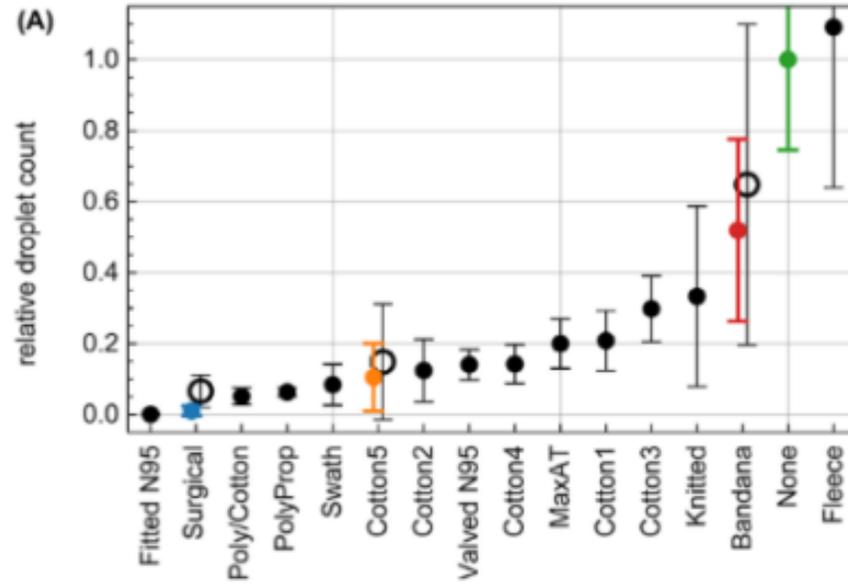
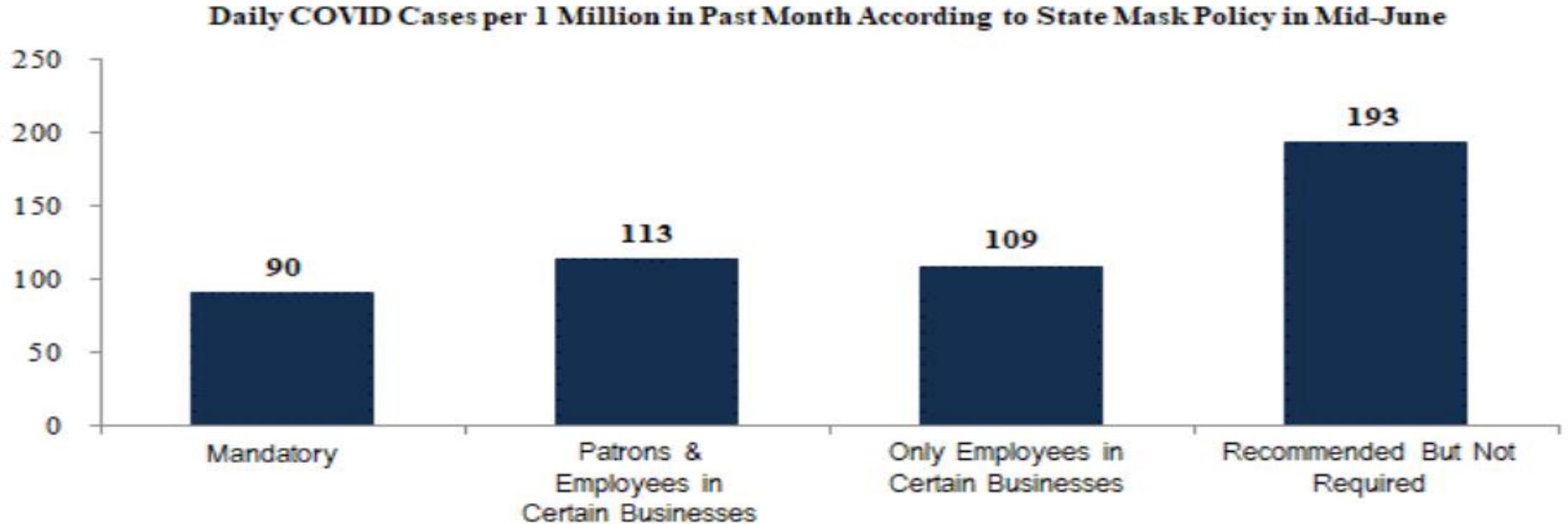


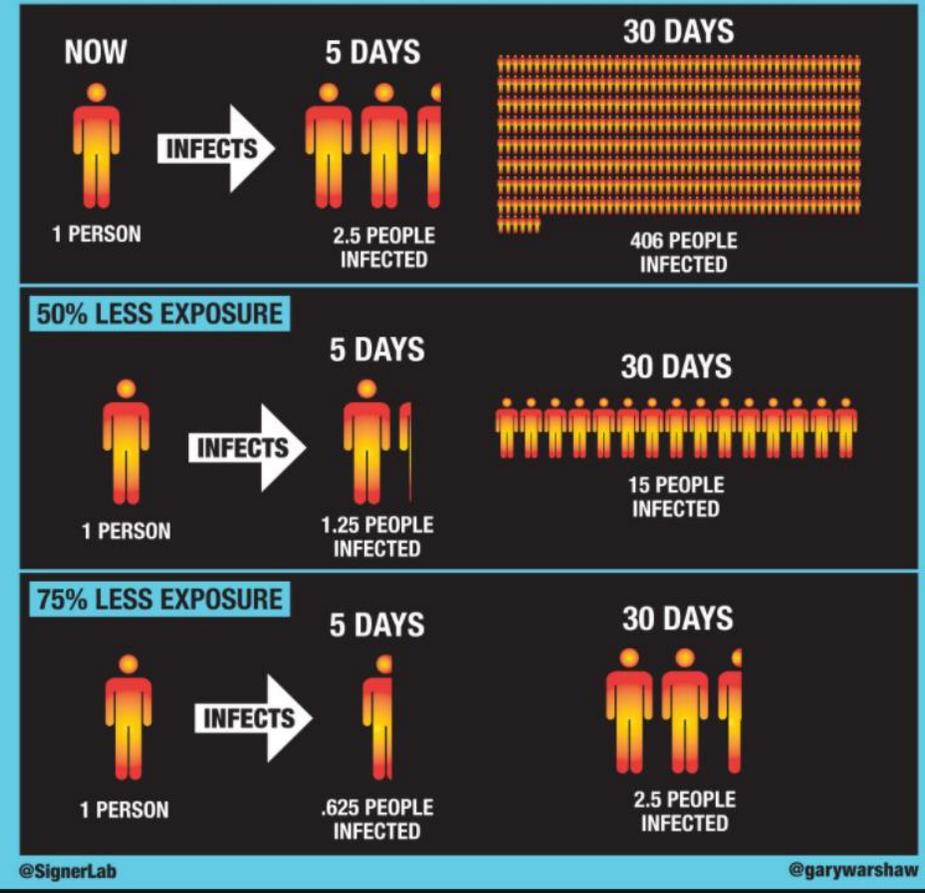
Figure 2. Effectiveness of different mask types at capturing respiratory droplets. A value of 0 means that all droplets were captured, while a value of 1 means no reduction in droplets. From Fischer and others 2020: Low-cost measurement of facemask efficacy for filtering expelled droplets during speech.

Efficacy of mask mandates



Source: State health departments, National Governors Association

THE POWER OF SOCIAL DISTANCING



Covid-19 vaccines





90 y.o. Margaret
Keenan in the UK

The three phases of vaccine development

- In Phase 1, the vaccine is given to healthy, adult volunteers. This phase helps scientists understand if the vaccine is safe, if it seems to work, if there are serious side effects and if the size of the dose seems related to any side effects.
- In Phase 2, more adult volunteers receive the vaccine. Scientists are looking for the most common short-term side effects and how the volunteers' immune systems are responding to the virus.
- In Phase 3, scientists examine more volunteers to see how people who do receive the vaccine fare compared with people who don't receive the vaccine. They determine if the vaccine is safe, if it is effective, and what the most common side effects are. Even with Emergency use authorization, we are still in phase 3.

FAQs on Covid-19 vaccines: answers

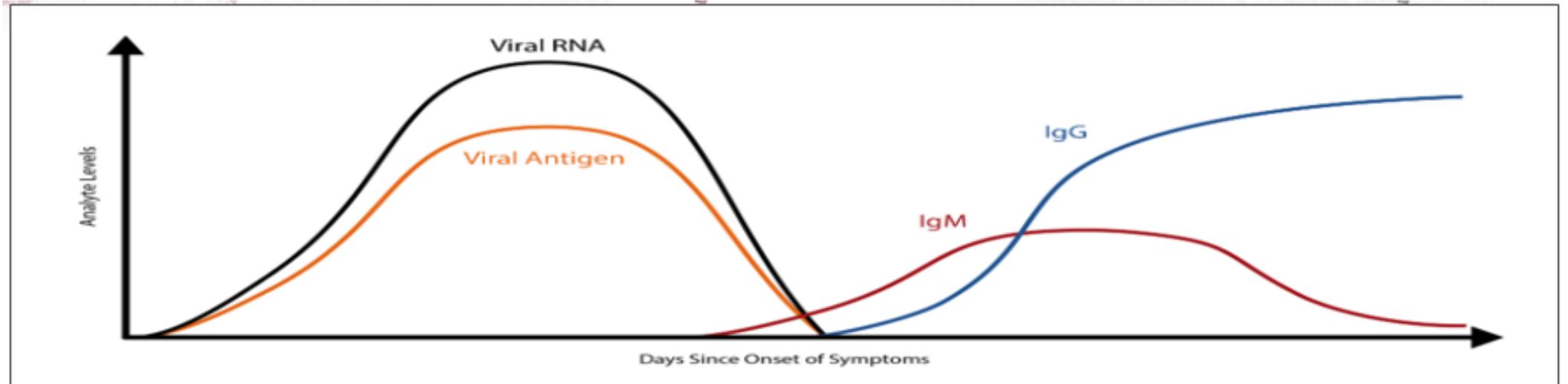
- Covid-19 vaccines will not give you Covid-19
- So far side vaccine side effects include injection site soreness, myalgia, fatigue, fever
- Covid-19 vaccines will not cause you to test positive on Covid-19 viral tests
- People vaccinated may test positive on some antibody tests
- People who have gotten sick with Covid-19 may still benefit from getting vaccinated
- Getting vaccinated can help prevent getting sick with Covid-19
- Recent studies suggest durability of antibody response for >90 days after second vaccine
- Receiving an mRNA vaccine will not alter your DNA or RNA
- You cannot mix vaccines
- Limited study in children and pregnancy, however it is recommended for pregnant or nursing females in high-risk situations.

Vaccine: Antigen exposure provokes immune response to block virus if infected

- Over 130 vaccines being developed
- Virus inactivated or weakened
- Viral vector
 - Replicating
 - Non-replicating
- Protein bound
 - Protein sub-unit
 - Virus like particles
- Nucleic acid
 - RNA, DNA



Antibody production post Covid infection



Exposure to COVID-19 triggers temporary IgM antibodies followed by long term IgG antibodies

STHS able to test for total COVID-19 IgG using Ortho platform*

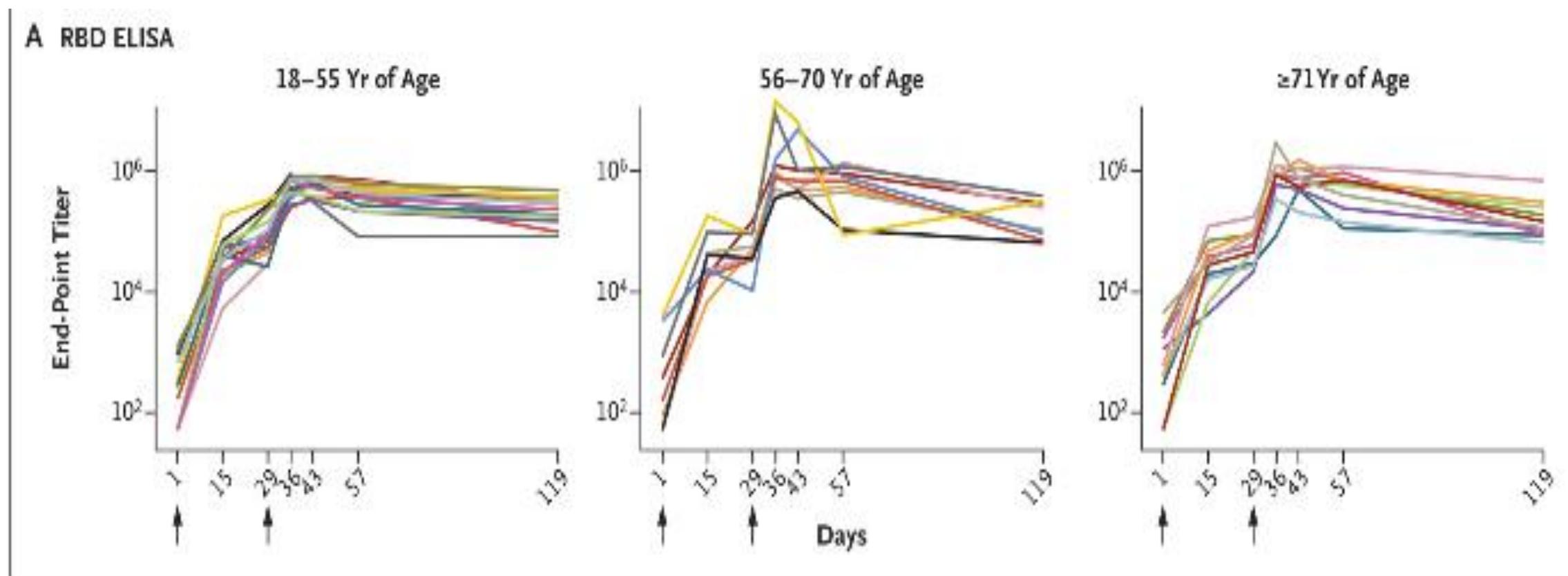
Presence of COVID-19 IgG antibodies suggests previous exposure

Questions:

Are these antibodies specific for the Novel Corona Virus?

Does presence of IgG antibodies confer immunity to COVID-19?

Durability of Responses after SARS-CoV-2 mRNA-1273 Vaccination



December 3, 2020

DOI: 10.1056/NEJMc2032195

Protective antibodies after Covid-19 infection

- Fishing ship: outbreak-3 people with protective antibodies did not get sick
 - 104/122 of seronegative patients converted to positive on repeat testing
- Summer camp outbreak-16/152 people with prior antibodies did not get sick
 - 80% positivity rate for seronegative people
- Health care worker immunity study at 6 months: neutralizing antibodies persist
 - 1246/12219 positive IgG assays to spike protein or nucleocapsid
 - 79 seroconverted during follow up
 - 89 PCR-confirmed symptomatic infections in seronegative individuals
 - 0 in seropositive individuals
 - In asymptomatic infections 76 in seronegative vs. 3 in seropositive

Ref: JCM;2107-20,2020

Ref: MMWR; 69(43);1600-1604

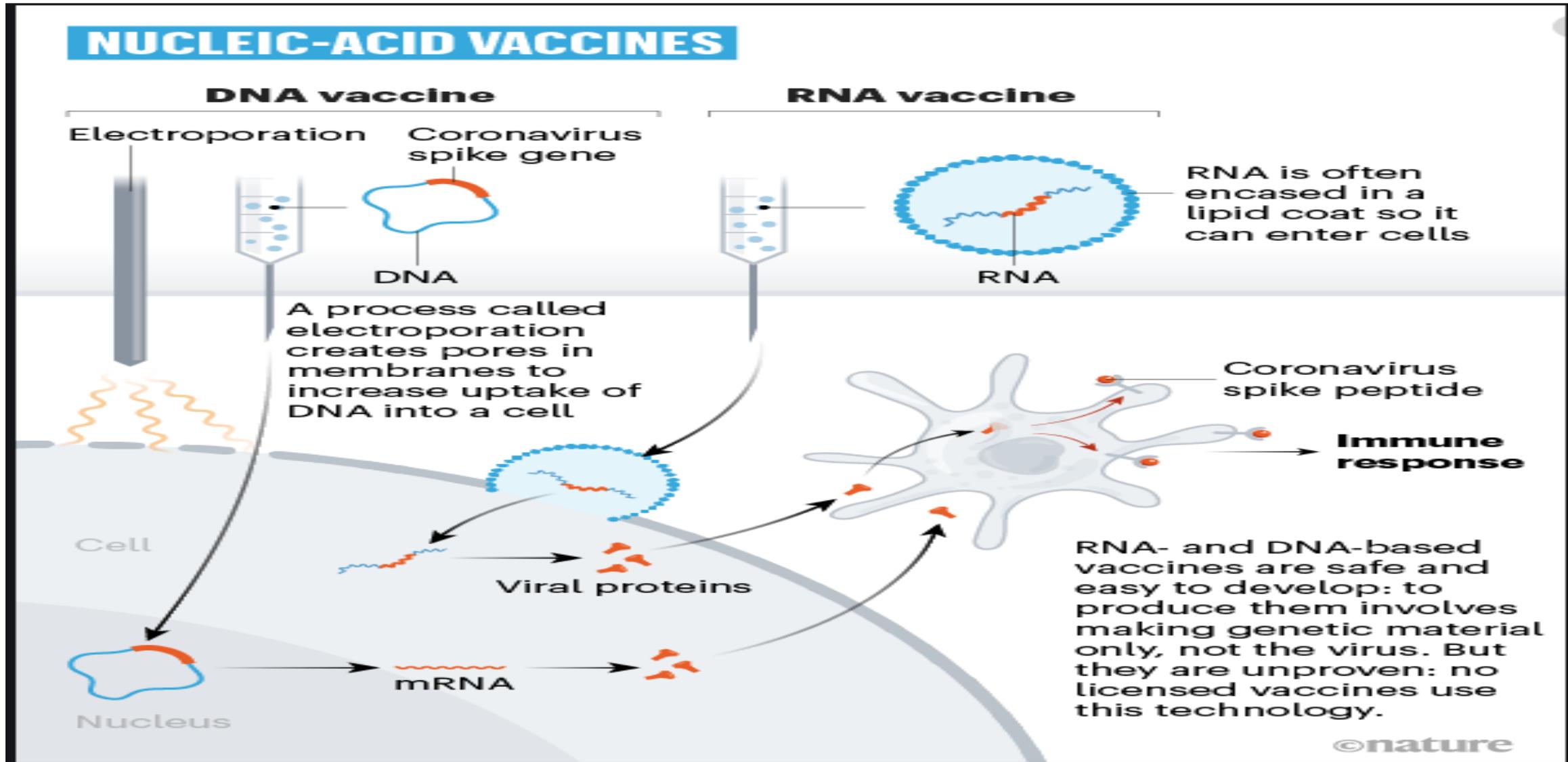
Ref: BMJ:Nov,2020

Nucleic acid vaccines

mRNA vaccines: Moderna and Pfizer/BioNtech

- Easy to develop
- Make genetic material only
- Robust antibody response
- Infected cell produce protein (spike protein)
- Viral spike mutations not reported
- Transport and storage challenges

Nucleic acid vaccines



Adenoviral vector Covid-19 vaccine

J & J : Adenoviral 26 vector

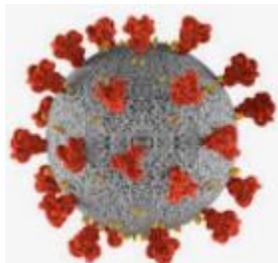
- Ebola vaccine
- Phase 3 study
- One dose
- -20c storage but stable in refrigerator x 28 days after thawing
- EUA: early 2021

Adenoviral vector Covid-19 vaccine

AstraZenica/Oxford

- Adenovirus vector
- Phase 3 trial
- EUA: may be delayed
- Storage at refrigerator temperature
- 2 doses, ½ first dose for best response
- Release in US: first quarter 2021

Covid vaccination at STHS



State distributes vaccines: limited supply

Pfizer and Moderna vaccines will be first

Both 2 doses, Pfizer 21 days apart,
Moderna 28.

Prioritization:

- Covid-19-direct patient care/contact
- Staggered vaccines
- Employee health to administer vaccine

LA Vaccine Rollout Phases

Phase 1a	Phase 1b	Phase 2	Phase 3
<p>Hospital personnel with direct COVID-19 exposure and care</p> <p>Personnel at nursing homes and adult residential care facilities</p> <p>Residents/patients at nursing homes and adult residential care facilities</p>	<p>Most other medical field personnel – including home care personnel</p> <p>First responders: Firefighters, EMS, law enforcement</p> <p>State and federal COVID-19 response personnel</p> <p>Public transit personnel</p> <p>Pharmacists</p> <p>Food processing and packing personnel</p> <p>People 65 or older with</p>	<p>K-12 school and day care personnel</p> <p>Grocers and food distributors</p> <p>Utility personnel</p> <p>Government: Support services, community program personnel, Department of Homeland Security personnel, National Guard, federal intelligence and security personnel, military personnel</p> <p>Postal workers</p> <p>Laboratory personnel</p> <p>Mortuary personnel</p>	<p>General public – open access</p>

Post-Covid-19 syndrome



A significant number of Covid-19 patients are dealing with symptoms long after the initial infection. The Wall Street Journal asked four patients to share their stories about how lingering effects are affecting their lives

WSJ: 12/1/2020

Post-Covid-19 syndrome

- 10% hospitalized patients will have chronic sequelae (Long haulers)
- Fatigue
- Shortness of breath
- Headache
- Cough
- Joint pain
- Chest pain
- Muscle pain or headache
- Tachycardia
- Loss of taste or smell
- Memory, concentration or sleep problems
- Rash or hair loss- Covid toes
- POTS (postural orthostatic tachycardia syndrome) dysautonomia

Future state: Predictions

How will the pandemic end

- Masks, social distancing, and hand washing will continue
- Vaccine distribution will take time but eventually many vaccines
- Once critical mass is vaccinated: may need proof of vaccine for various venues
- The world will need to be vaccinated to eradicate the virus
- May be sporadic outbreaks in the future
- Will we need yearly vaccinations
- There will be a subset of people who will have long lasting health effects from the virus
- Social and business norms will be different
- Many people near retirement are leaving the work force
- Will we heed the lessons we have learned for the next pandemic

