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Retrieved from: https://youtu.be/XFZV1GCTTvE

COVID-19: THE PERFECT PANDEMIC

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14 MAY 2020

WHAT WE KNOW RIGHT NOW

- Person to person spread through droplets, personal contact, environmental surfaces, maybe aerosol?
- Incubation period of 1-14 days, mean around 5 days
- About 14%-20% of cases are severe; 50% (?) of infections are asymptomatic
- About 2% of those infected die – range between 0.5% and 3.5%
  - Elderly, morbidly obese, those with co-morbid conditions at higher risk of dying
- People can shed virus early in the infection before symptoms appear
- People are infected but never have symptoms can shed virus
- Virus can affect many organs including heart, brain, kidneys, as well as lungs

WHAT WE DON'T KNOW THAT WE WISH WE DID

- When a person is most infectious?
- What percent of the population has been infected?
- Case fatality rate/infection fatality rate
- Does everyone develop antibodies? How long does immune protection last? Does it depend on severity of infection?
- What is R_0?
- Is there aerosol transmission and if so, how important is it in the epidemiology?
- Is high-dose transmission linked to severity?
- How long can virus can remain in environment – preliminary reports of up to 2-3 days under lab conditions
- Will virus disappear when warmer weather occurs? And if so, will it return next fall?
- Are children drivers of the infection?

THE PERFECT PANDEMIC

- The virus:
  - New virus, no cross-reactivity with other coronaviruses, so no previous immunity in population
  - Highly infectious
  - Short incubation period
  - Low death rate
  - Infectious before symptoms occur
  - Those infected without symptoms can transmit
  - No vaccine, no (good) therapeutics
  - ACE2 cell receptor – on many organs

THE PERFECT PANDEMIC

- Society
  - Global travel
  - Social Media
  - Lack of preparation
  - Politicization of public health measures
  - No national strategy

Effect of Community Mitigation

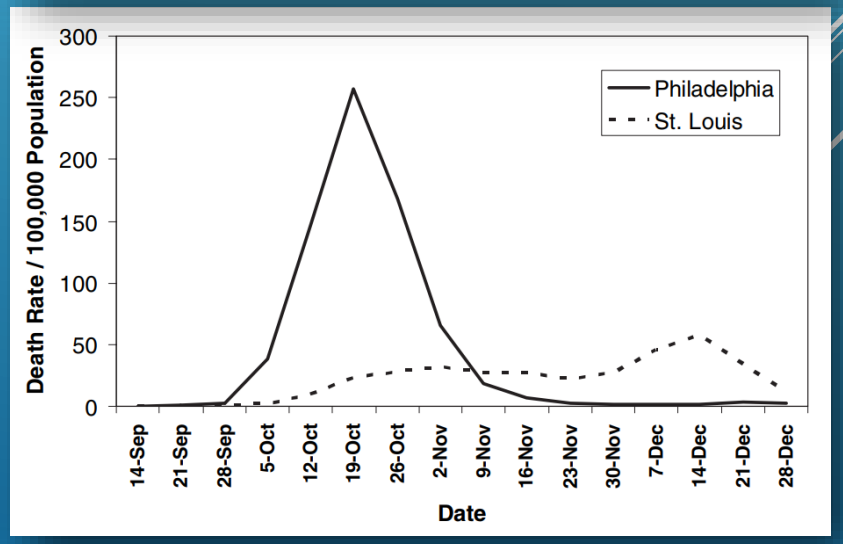
Earlier timing of interventions was associated with lower peak death rates

Interventions included:

- Closure of schools, churches, dance halls, and theaters
- Bans on public gatherings

Examples from Philadelphia and St Louis

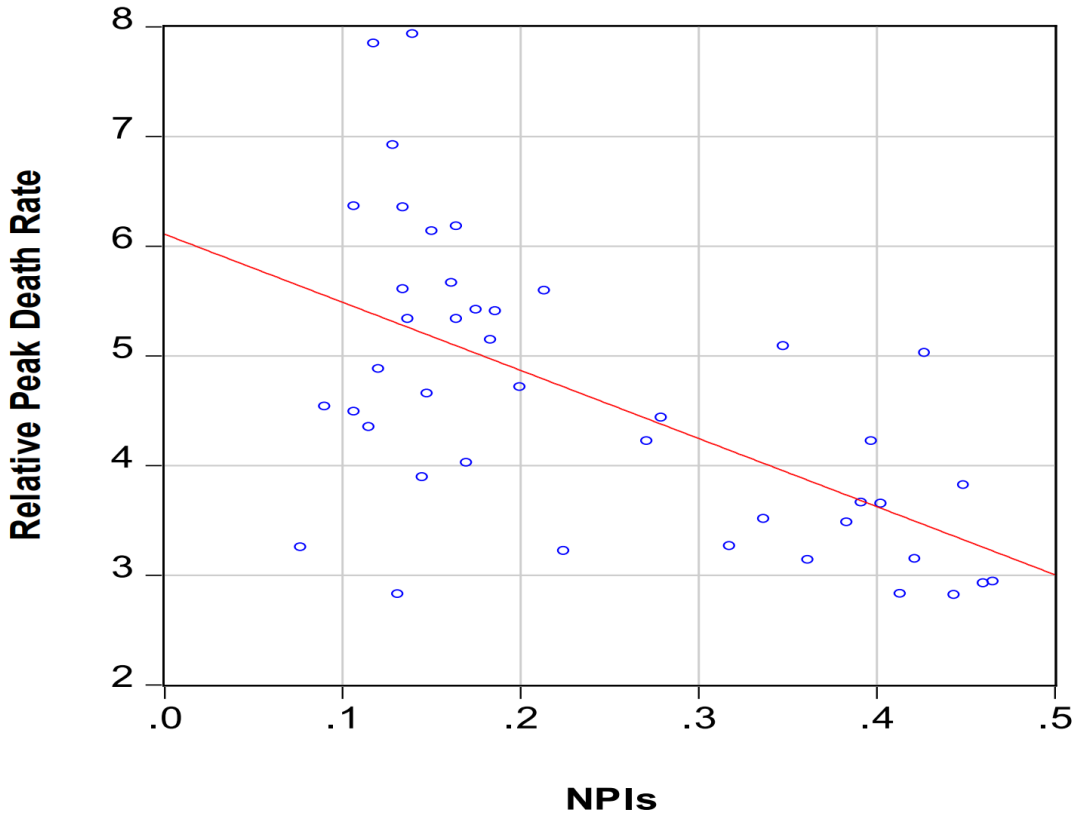
- Philadelphia *delayed* implementation of interventions, allowed Liberty Loan Parade in September
- St Louis implemented multiple measures *early* after first cases identified



Information on slide courtesy of Dan Jernigan/CDC; Hatchett PNAS 2007; Markel JAMA 2007.

Figure 3

Relationship between NPIs and Relative Peak Death Rate

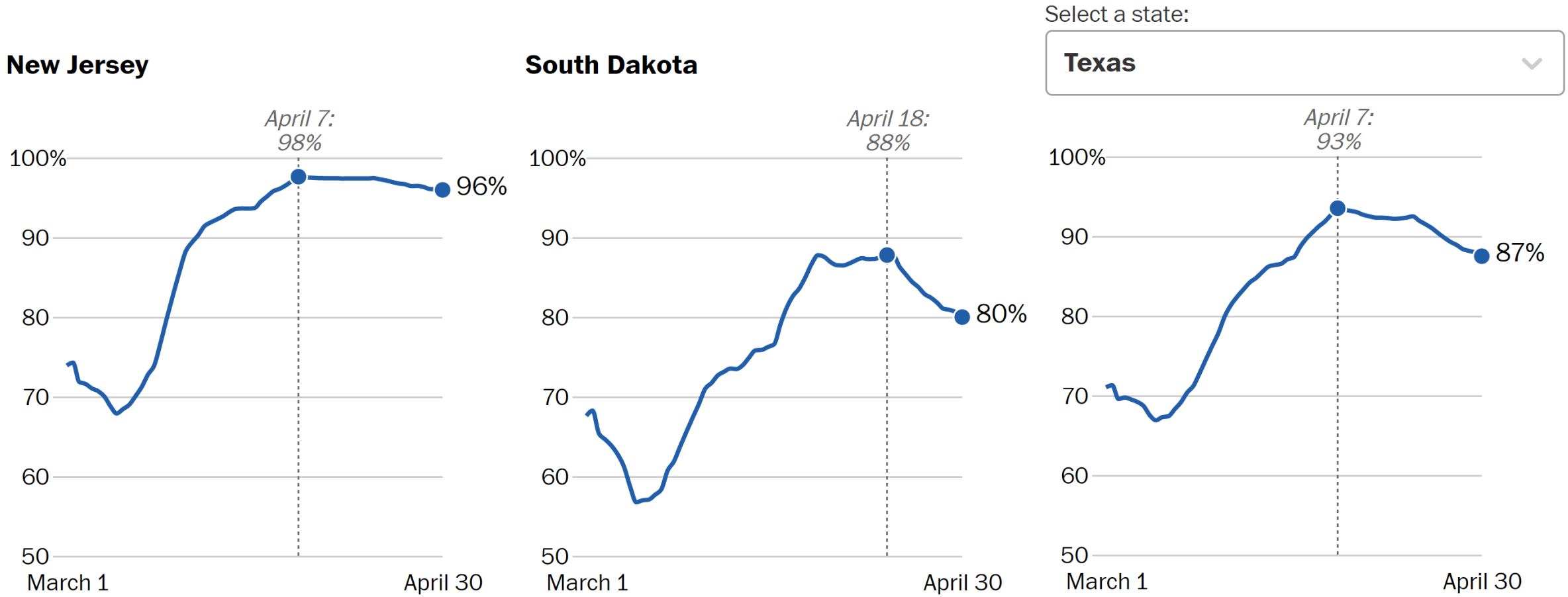


Note: NPIs is from Markel, et al. (2007, Table 1). The relative peak death rate, defined as the ratio of the peak weekly death rate to the average weekly death rate, is calculated from Collins, et al. (1930, Appendix, Table B).

https://poseidon01.ssrn.com/delivery.php?ID=500081090119064071076115006112110005069045049046016042072106052006039042028073010024112006003042002057095126098089118008021087029102085101112075010095067064065083069075064005118088&EXT=pdf

Some states are starting to leave home more than others

Share of time spent at home, for the seven-day period ending on each date



Washington Post 6 May 2020

Sheltering in states that reopened last week

STATE	NORMAL	PEAK	LAST WEEK	CHANGE
Indiana	22%	42%	33%	-9.0
Georgia	20	40	32	-8.5
Missouri	20	40	31	-8.4
Tennessee	20	38	29	-8.4
Texas	19	40	32	-8.1
Idaho	22	39	31	-8.1
Kansas	19	39	31	-7.7
Florida	21	43	35	-7.3
West Virginia	23	41	33	-7.2
South Carolina	20	37	30	-7.1

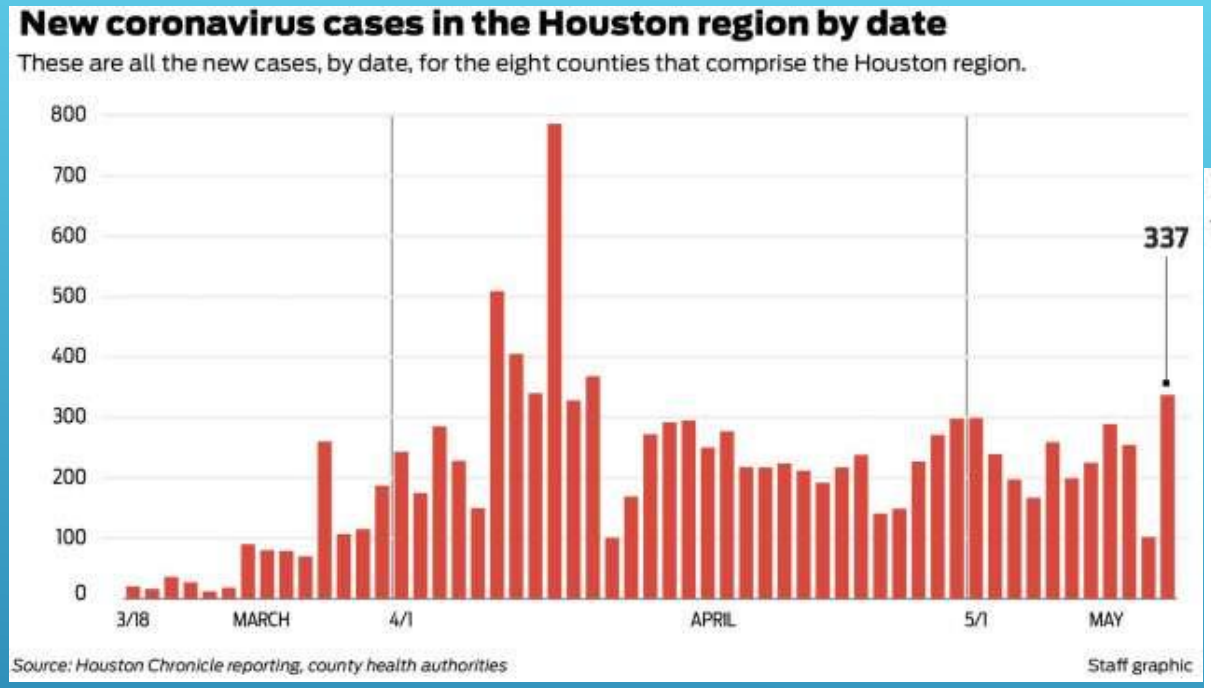
Note: Stay-at-home orders in these states lifted between May 1 and May 8.

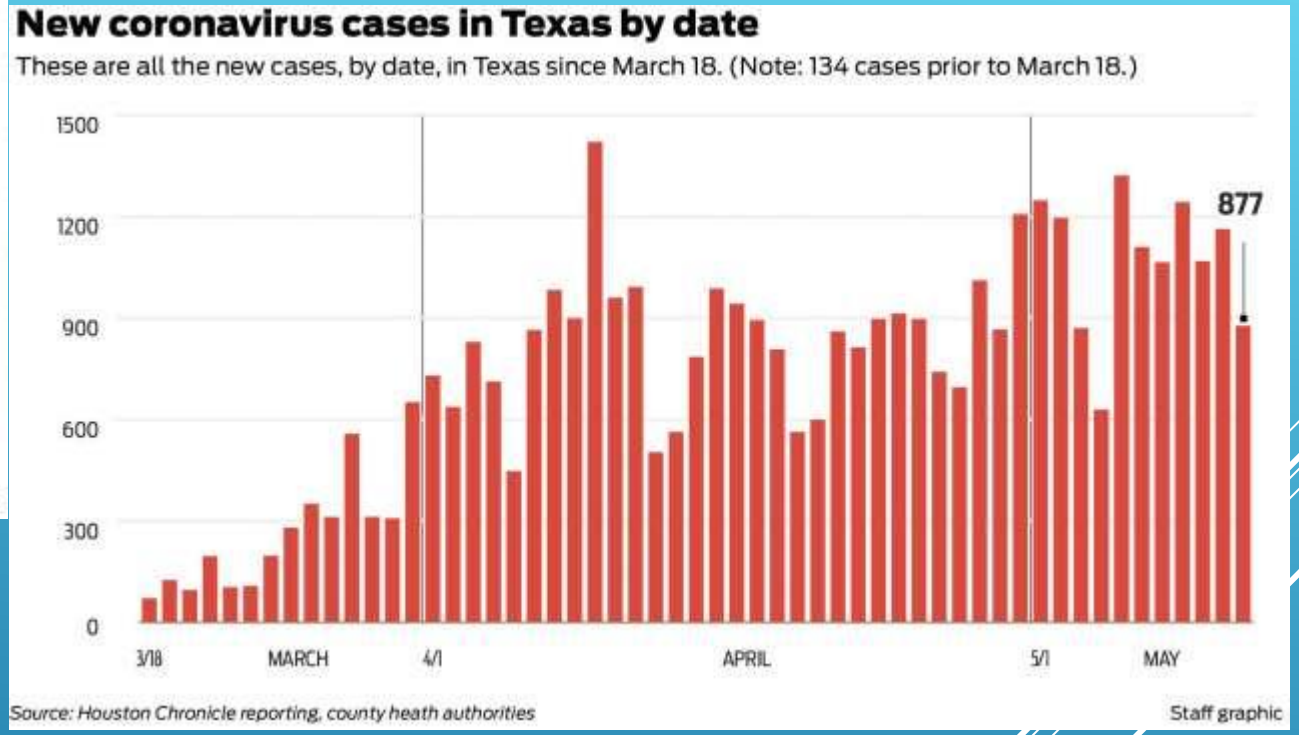
HTTPS://WWW.NYTIMES.COM/INTERACTIVE/2020/05/12/US/CORONAVIRUS-REOPENING-SHUTDOWN.HTML

BUT THAT WAS THEN…

XKCD Comic
@xkcdComic

Coronavirus Polling xkcd.com/2305/ m.xkcd.com/2305/





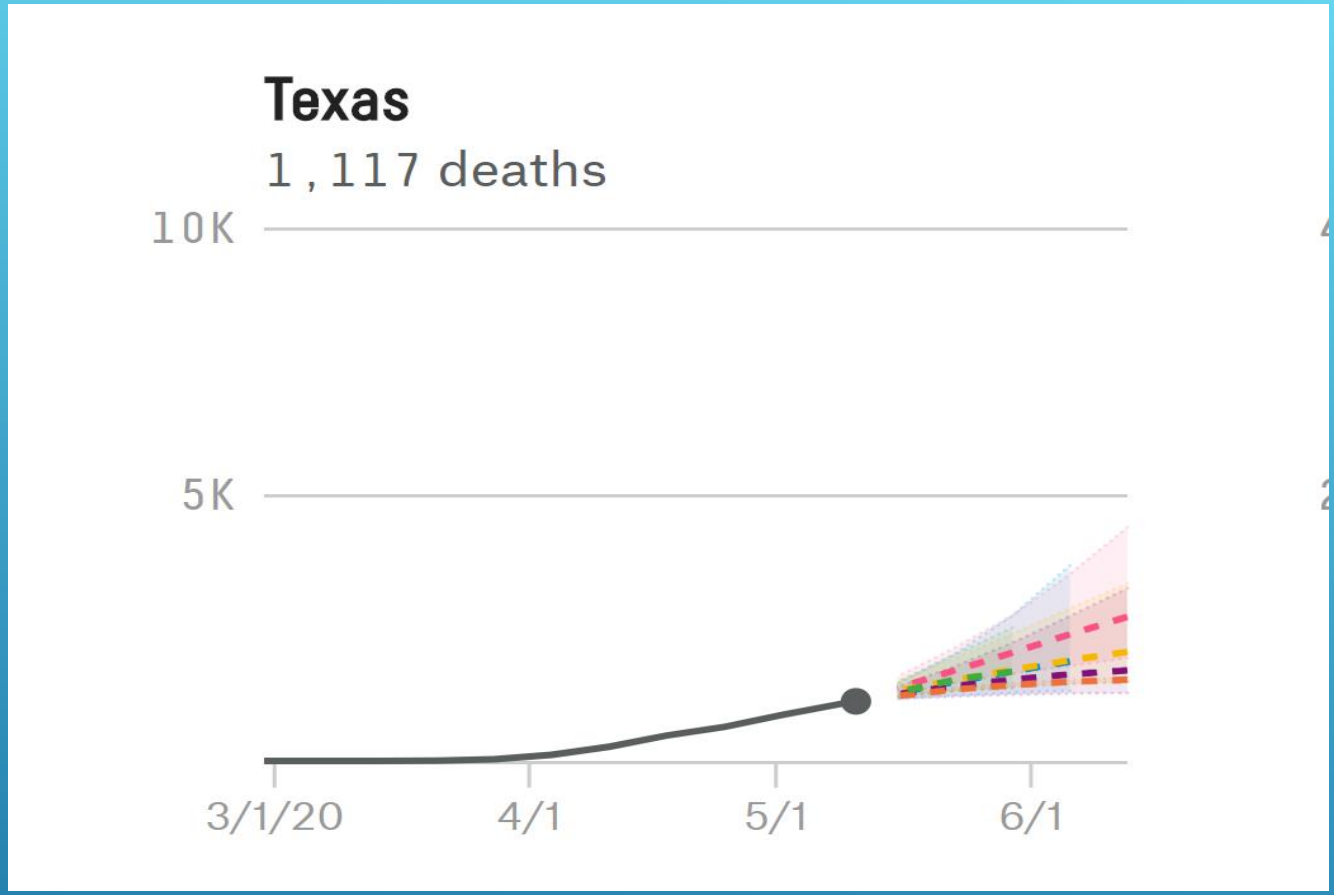
CURRRENT SITUATION – TEXAS

WHAT'S GOING TO HAPPEN?

Easy to predict, harder to be right

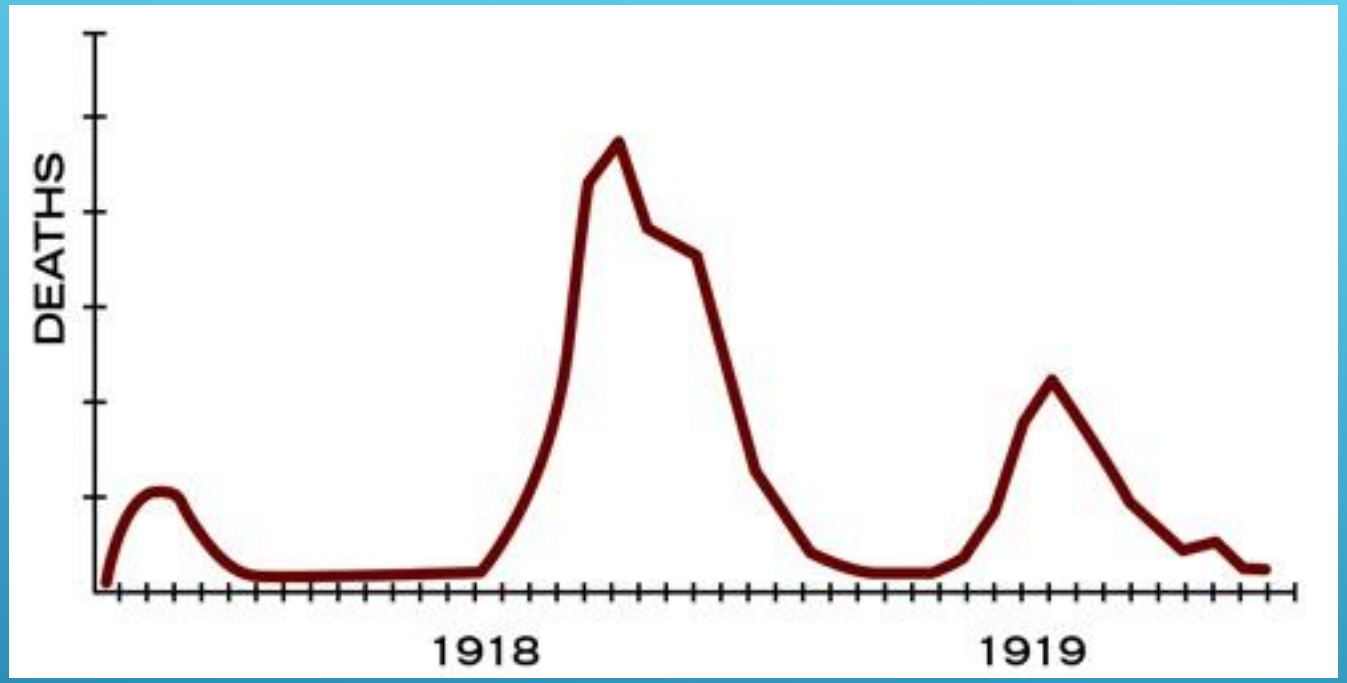
Wave has not crested everywhere	What happens in summer, fall?	How long physical distancing, community mitigation lasts	May eventually become endemic like some other respiratory viruses

Will depend on physical distancing, mask compliance, other NPIs plus characteristics of the virus

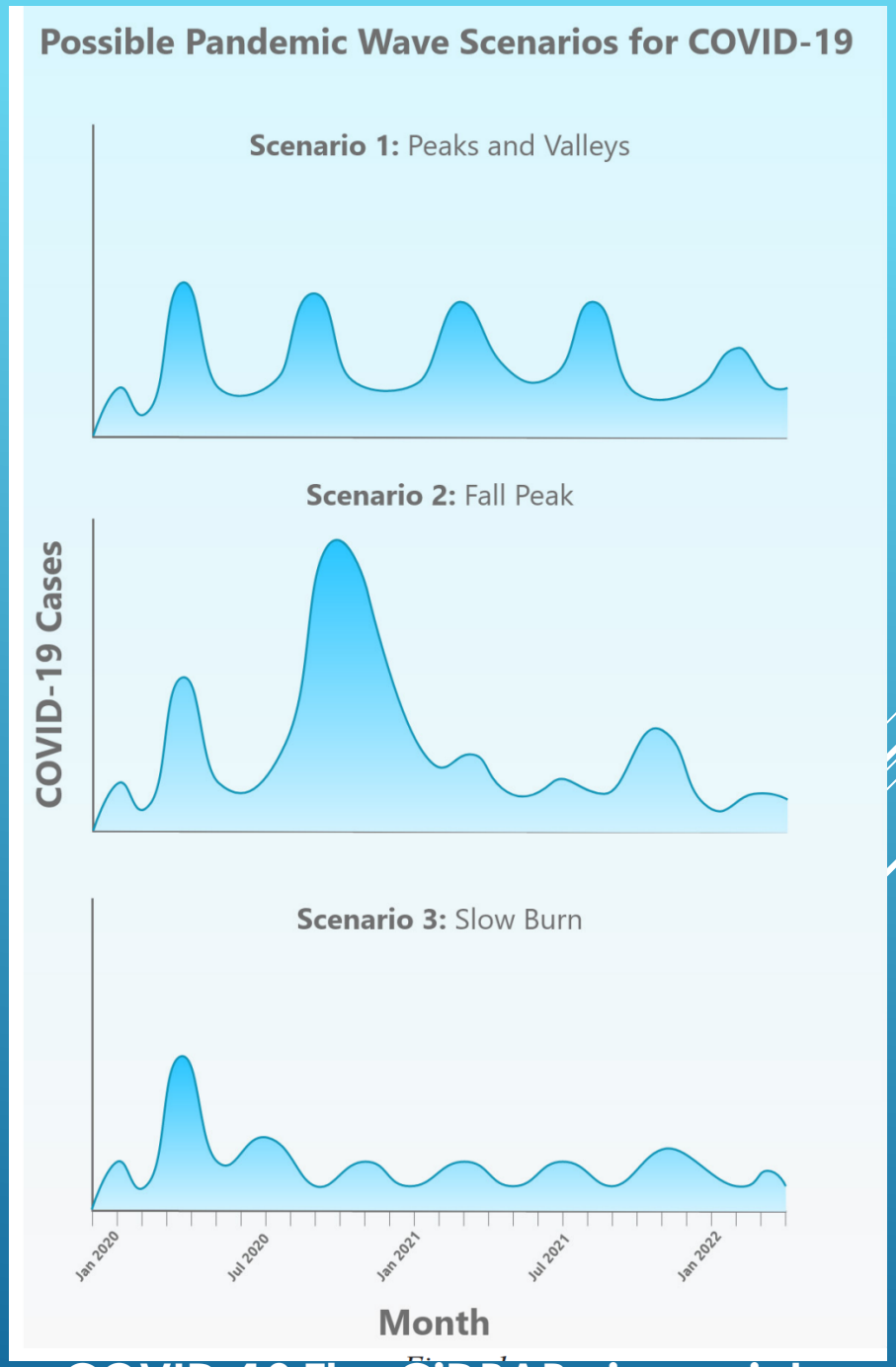


PREDICTIONS FROM SIX MODELS

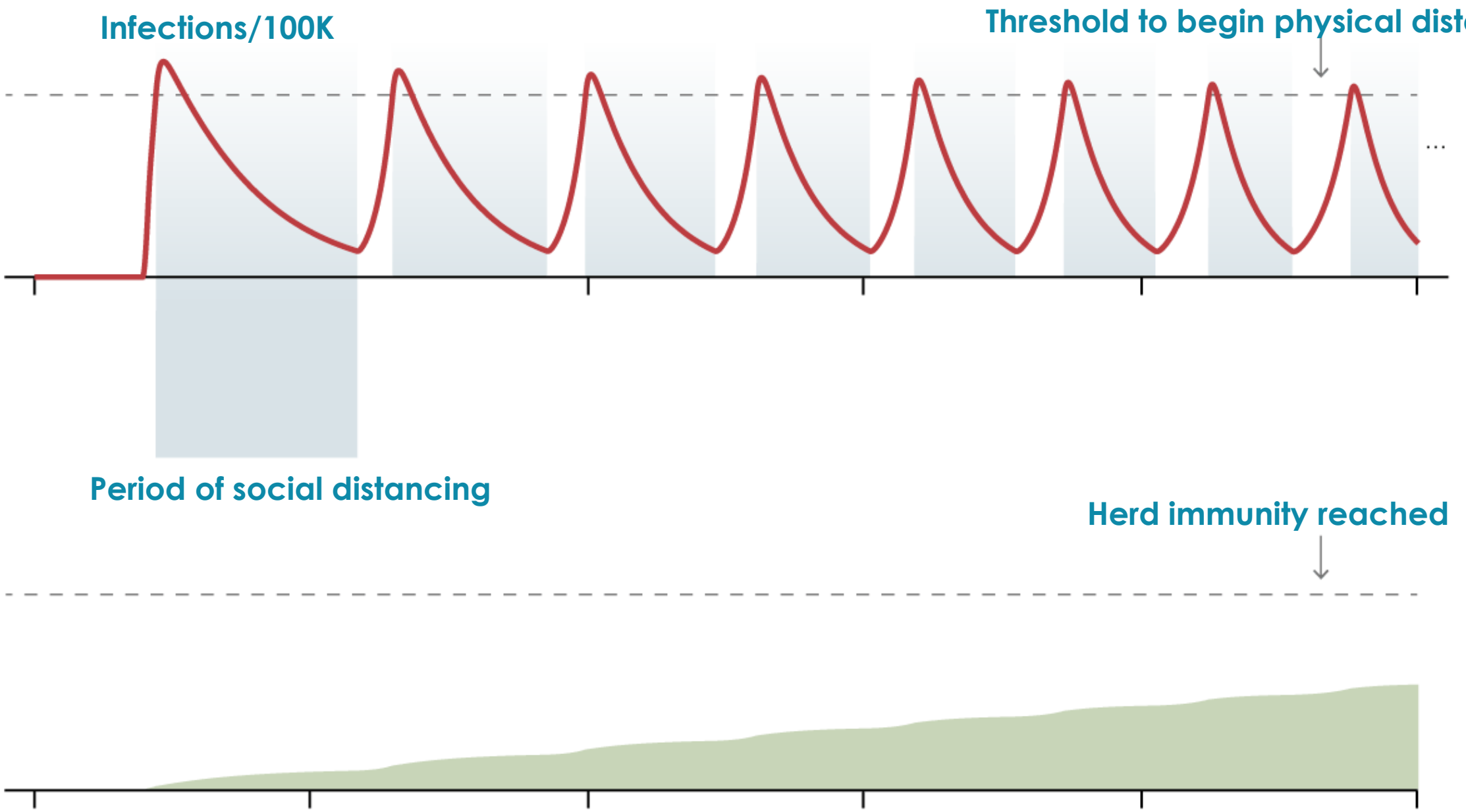
https://projects.fivethirtyeight.com/covid-forecasts/?ex_cid=rrpromo&utm_campaign=wp_the_health_202&utm_medium=email&utm_source=newsletter&wpisrc=nl_health202



SECOND WAVE?



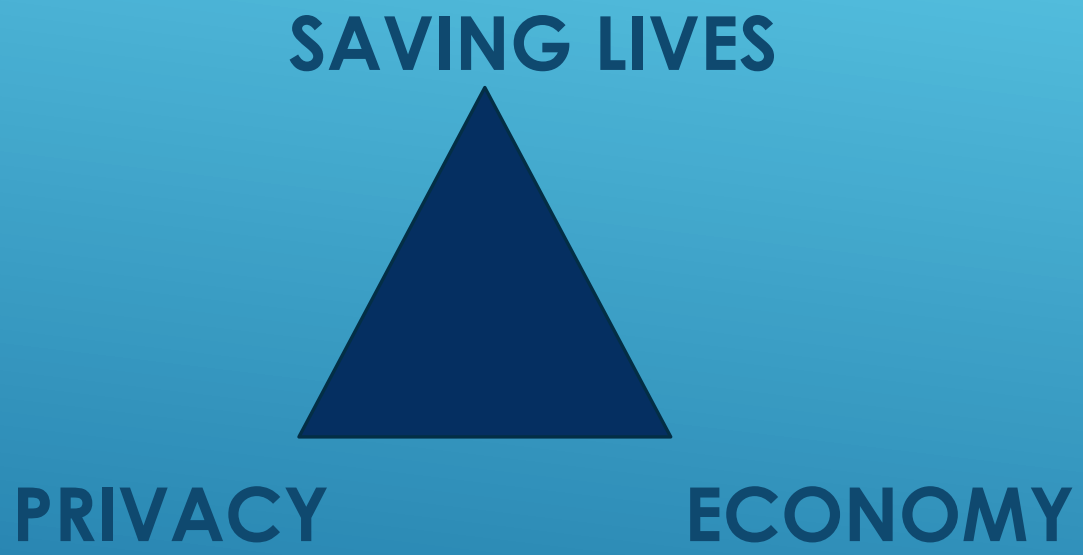
COVID-19 The CiDRAP viewpoint



NYT 8 May 2020

OPENING UP

- How will we decide when/how to lift mitigation – need to be thinking about it now – may have “drug holiday”
- What should be in place
  - Testing is key – most cases are detected
  - We are on downside of the curve – 14 days of decreasing cases
  - Medical system has capacity to handle cases
  - Case numbers small enough that we can trace them all
  - Enough contact tracers
  - Procedures identified if cases start to rise
- Major caveat: importation



TRILEMMA – DIFFICULT DECISIONS NEEDED

CONTACT TRACING

Standard technique of public health – STI, HIV, TB, Ebola, other outbreaks

- Identify cases
- Identify contacts (models and data show about 50/case)
- Notify contacts to self-quarantine

Human

- Time intensive
- Estimated 100K needed

CONTACT TRACING

Apps – cell phone sends bing to other phones in area

- Would require ~60-80% to have app
- Privacy concerns
- Technological issues
- Issues of how long in contact, how close

Caveats

- Testing availability
- Asymptomatic infections
- Still learning about infection
- Number of cases
- Funding environment/staffing

TEMPERATURE CHECKS

- Have been suggested to help control transmission
- Asymptomatic transmission an issue
- One study showed 30% of known cases were febrile at time of hospital admission
- Infrared gauges not accurate
- Privacy issues
- During SARS, airport temp checks did not identify any cases
- Screening at airports has not caught any cases during current pandemic
- Fever reducers

MEASURES SCIENTISTS WORKING ON

- Antivirals and other therapeutics
- New assays
  - Faster diagnostic testing
  - Reliable antibody tests
  - Antigen tests
  - At home tests
- Vaccine
  - Effective
  - Safe
  - Long-lasting
  - Challenge experiments
  - Will need to scale up production
  - Price?
  - Acceptability?

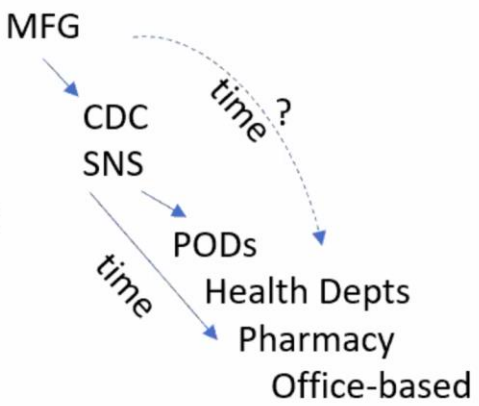
COVID-19 US Vaccine Introduction Overview

Initial Response

2020-2021

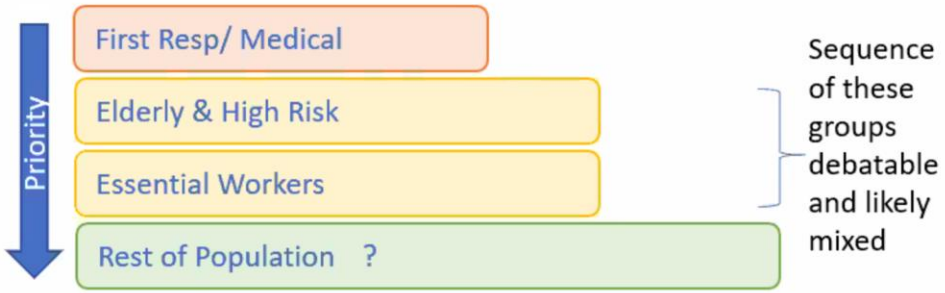
Distribution

- Like H1N1, HHS will purchase doses and direct distribution from manufacturer to PODS (Point of Deliver System)
- Additional providers added with capacity and uptake
- Demand anticipate very high to start then likely wane over time



Prioritization

Assumptions: Directed by CDC/ACIP; HHS/NVAC;
Initially indicated for 18yrs +



With:
Continued circulation
&
Sufficient supply

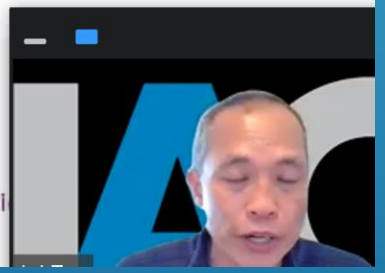
Transition to Routine?

2022-? forward

Routine immunization based on ACIP guidance developed from Evidence to Recommendation (EtR) process using:

- Epidemiology
- Safety
- Efficacy
- Duration of Immunity – natural & conferred
- HEOR
- Consumer interest

National Adult and Influenza Immunizati Summit



NOT JUST A PANDEMIC…

Economic consequences

Infodemic

- Role of social media
- Scams
- Lack of consistent information from leaders
- Lack of understanding of science in general
- Lack of understanding how science advances

Highlight on Inequities

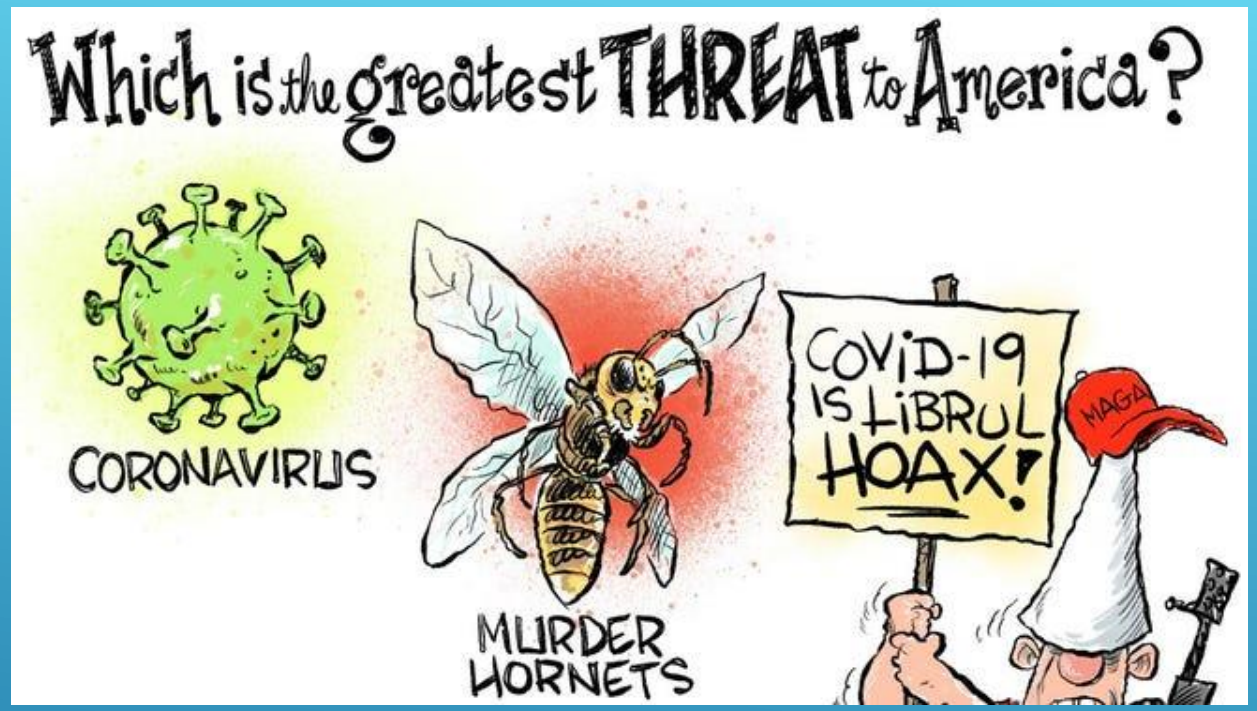
- “Essential” workers
- Communities of Color
- Vulnerable populations – nursing homes, criminal justice system, detention camps

NEED TO BE PLANNING AHEAD VS. RETROACTIVELY

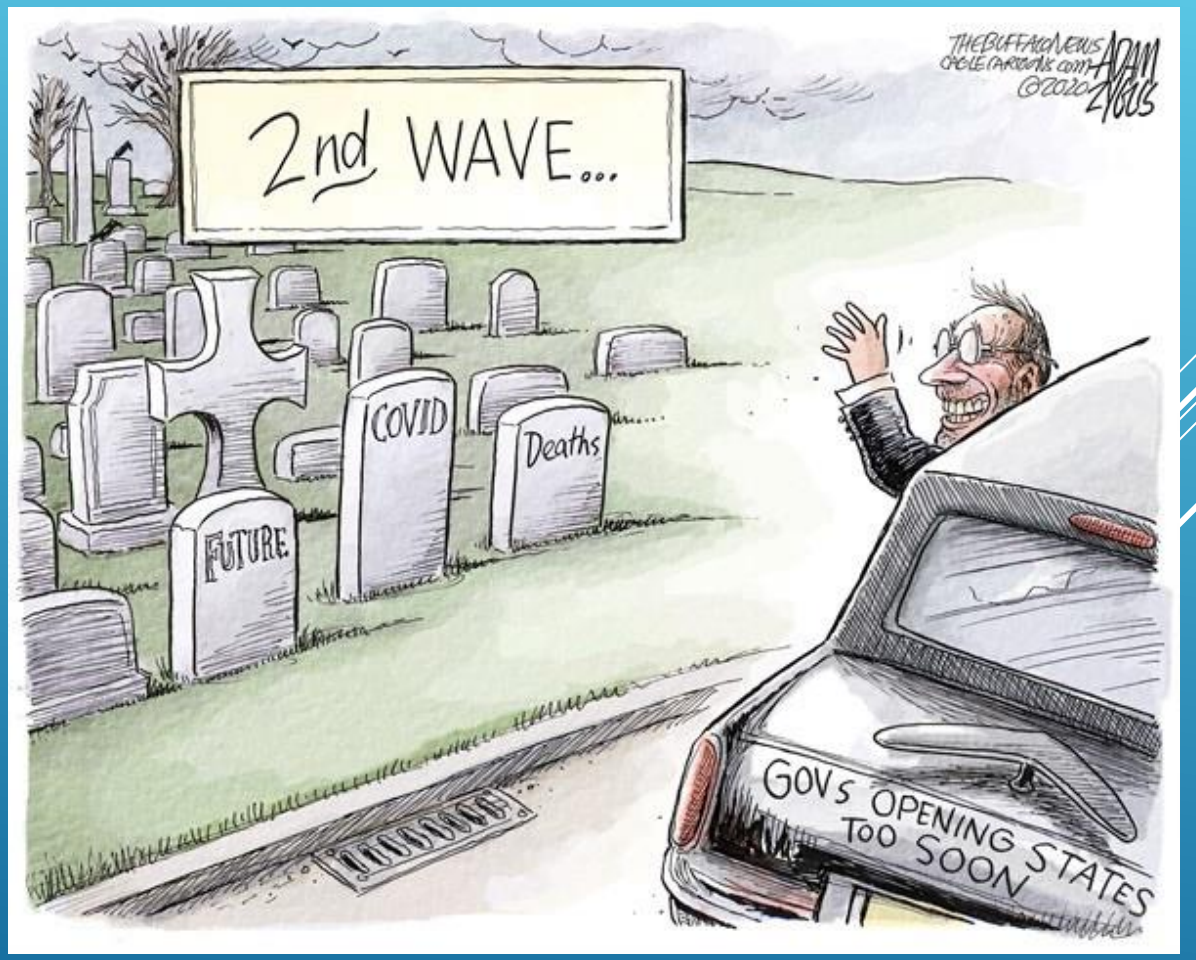
- We're in this together
- Importance of a national or at least state-wide strategy
- Medication shortages
- Ethical dilemmas – end of life, vaccine, immunity passports
- School openings
- Voting
- Healthcare models
- Society may be different after this experience – opportunities for social justice and public health

- Medical – incidence and death rates plummet
- Social – fear of disease wanes
- What will be lasting social, economic, psychologic effects?
- Opportunity to address some of the inequities that pandemic has revealed
- Public health funding increased?
- Will we be prepared the next time?

HOW DO PANDEMICS END?


Which is the greatest THREAT to America?
CORONAVIRUS
MURDER HORNETS
COVID-19 IS LIBRUL HOAX!
MAGA

USAToday


2nd WAVE...
FUTURE
COVID
Deaths
GOVS OPENING STATES TOO SOON