

Masks: It's Complicated

Wading through fact and fiction.



Total Confirmed

12,934,317

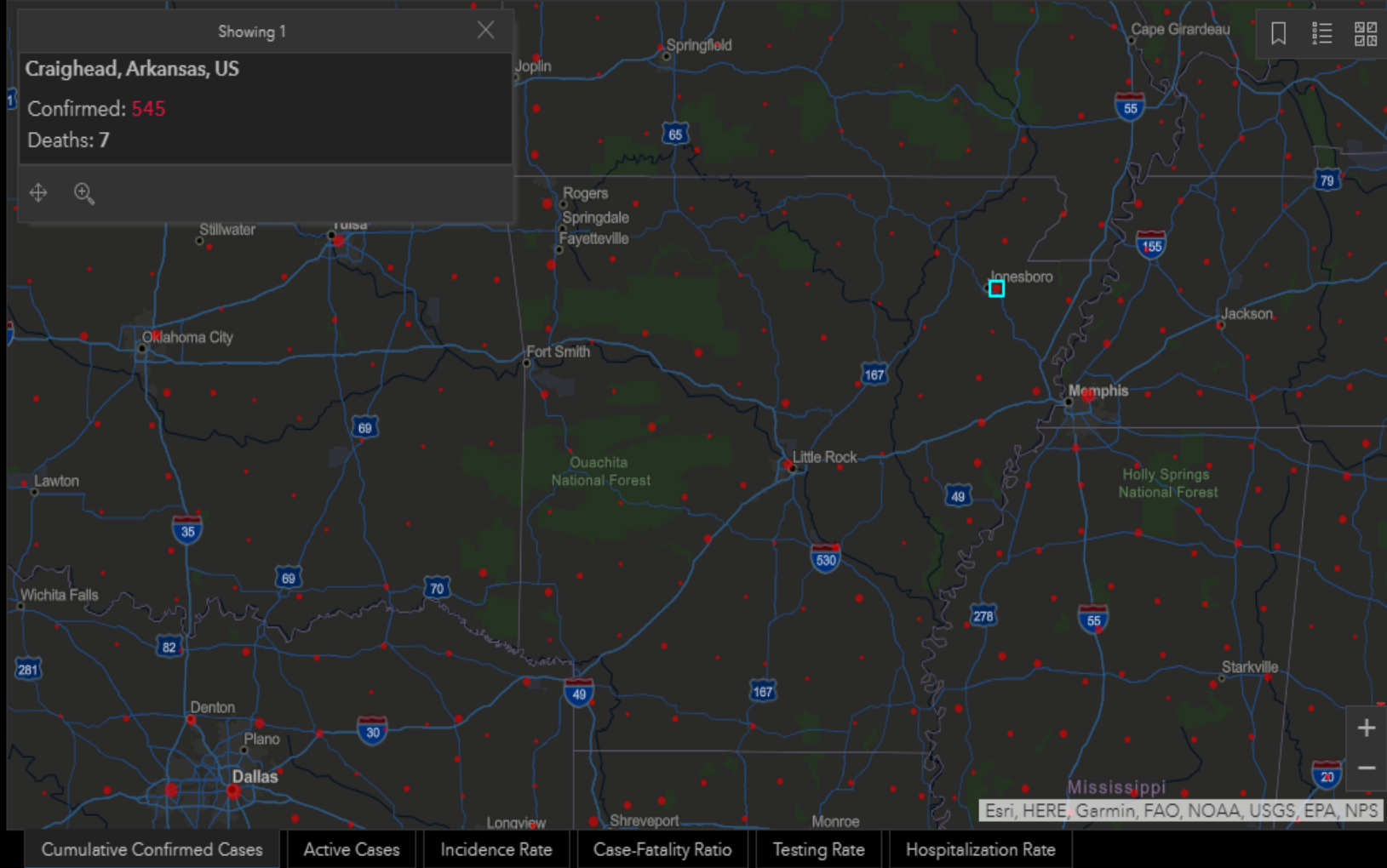
Confirmed Cases by Country/Region/Sovereignty

- 3,308,165 US
- 1,864,681 Brazil
- 878,254 India
- 732,547 Russia
- 326,326 Peru
- 315,041 Chile
- 299,750 Mexico
- 291,155 United Kingdom
- 276,242 South Africa
- 259,652 Iran
- 253,908 Spain
- 251,625 Pakistan
- 243,061 Italy

Admin0 Admin1 Admin2

Last Updated at (M/D/YYYY)

7/13/2020, 7:34:33 AM

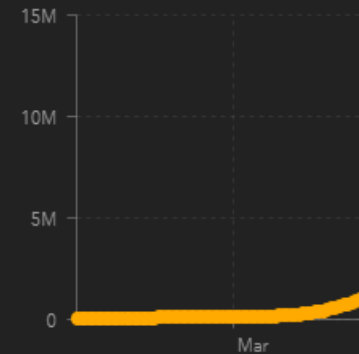


Global Deaths

569,697

- 135,213 deaths US
- 72,100 deaths Brazil
- 44,904 deaths United Kingdom
- 35,006 deaths Mexico
- 34,954 deaths Italy
- 30,007 deaths France

Global Deaths | Global Recovered



Confirmed | Logarithmic | Daily C

188

countries/regions

Lancet Inf Dis Article: [Here](#). Mobile Version: [Here](#).

Lead by JHU CSSE. Technical Support: [Esri Living Atlas team](#) and [JHU APL](#). Financial Support: [JHU](#) and [NSF](#). Resource support: [Slack](#), [Github](#) and [AWS](#). Click [here](#) to donate to the CSSE dashboard team, and other JHU COVID-19 Research Efforts. [FAQ](#). Read more in this [blog](#). [Contact US](#).

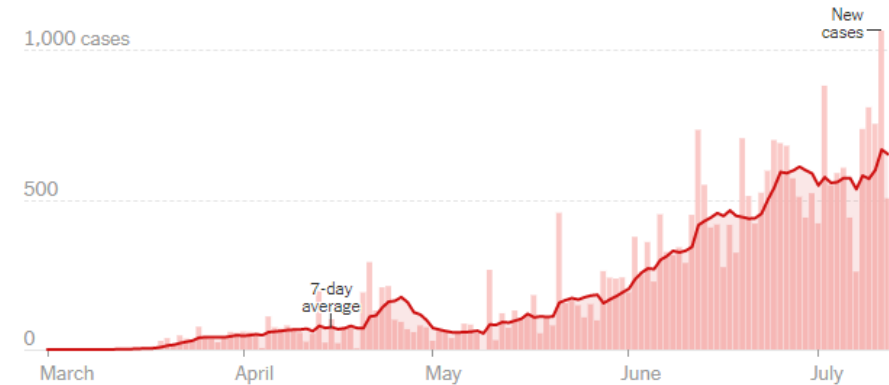
COVID19 Update

- Current Situation

- United States

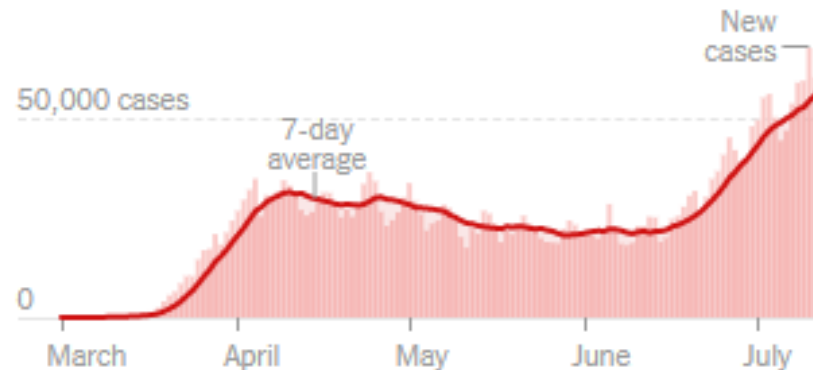
- Forty-Two (31 two weeks ago) have increasing cases
 - Ten are stable (16 two weeks ago) in terms of new cases
 - Two are decreasing (6 two weeks ago) (Maine and New Hampshire)

New reported cases by day in Arkansas



By The New York Times Updated July 13, 2020, 8:29 A.M. E.T.

[Leer en español](#)



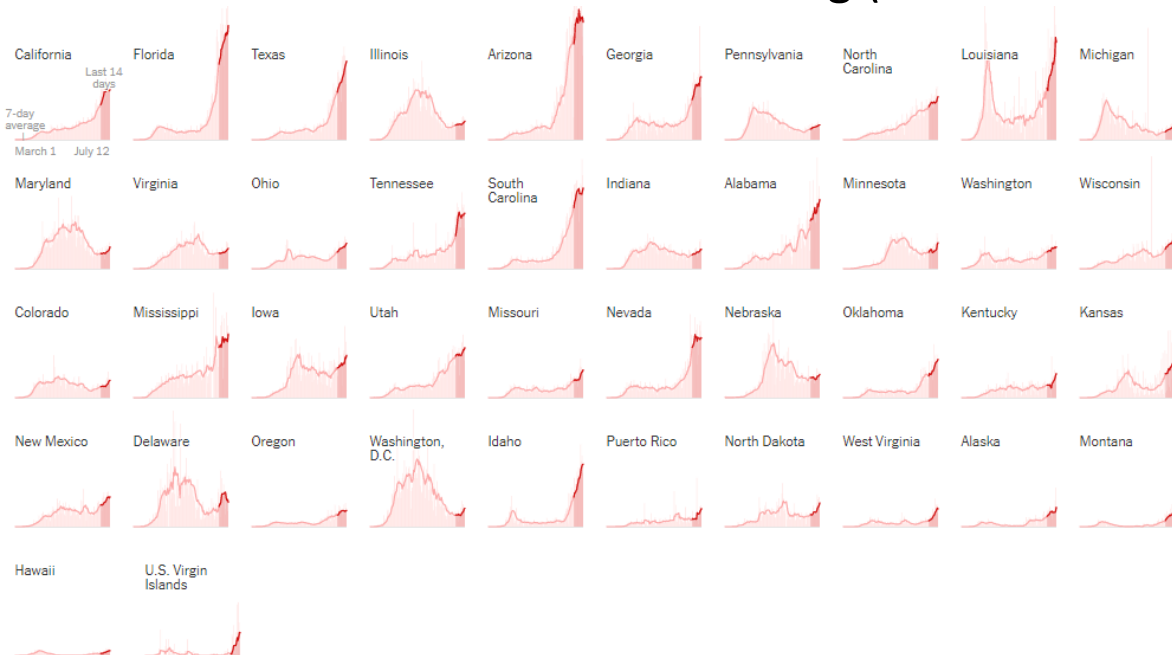
TOTAL CASES

3.3 million+

DEATHS

134,976

Includes confirmed and probable cases where available



COVID19 Update

- Arkansas (Current)

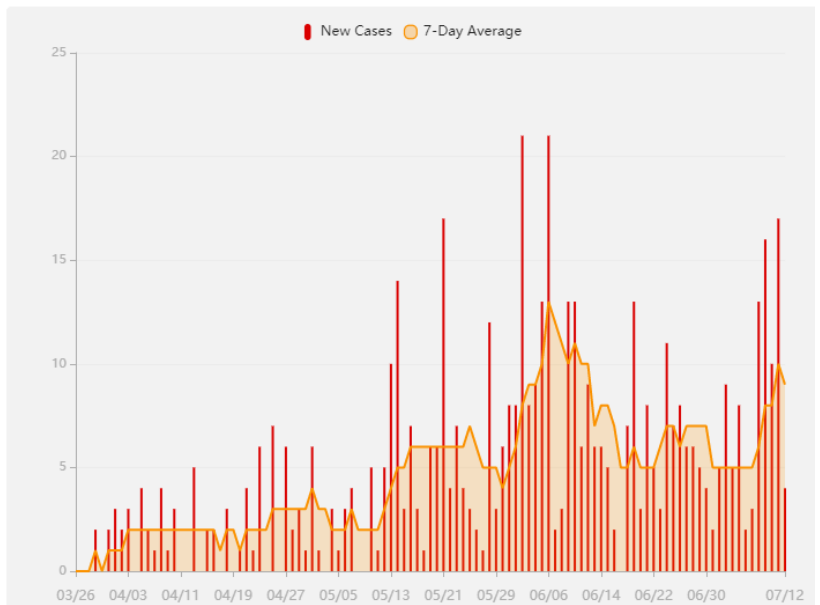
Craighead County

Confirmed Cases	Deaths†
545 +4 Yesterday	7 0 Yesterday

Last Updated: 7/13/2020, 07:23 PDT

7/13/2020 - Today's Coronavirus Report

- There are a total of **545** cases, with **4** new cases reported yesterday.
- 7** people have died, with **0** deaths reported yesterday.



The Arkansas Department of Health COVID-19 Case Update

Total COVID-19 Cases 28,367 <small>Last update: 2 minutes ago</small>	Number of COVID-19 Cases by County of Residence
Active Cases 6,455 <small>Last update: 2 minutes ago</small>	COVID-19 Metrics for Craighead County
Recoveries 21,591 <small>Last update: 2 minutes ago</small>	Cases Total Positive: 545 Active Positive: 72 Recovered: 466 Deaths: 7 Negatives: 11,971
Deaths 321 <small>Last update: 2 minutes ago</small>	View Border Report
Cumulative Number of Cases by Date	
	COVID-19 Cases COVID-19 Active Cases COVID-19 Deaths Tests Reported Health Metrics Case Demographics USA and World

Why is this a big deal?

- The potential to slow the spread of the virus and reduce the number of people that get infected, hospitalized, or die.
 - UAMS School of Public Health – July 3, 2020 report on projected cases for the state of Arkansas.

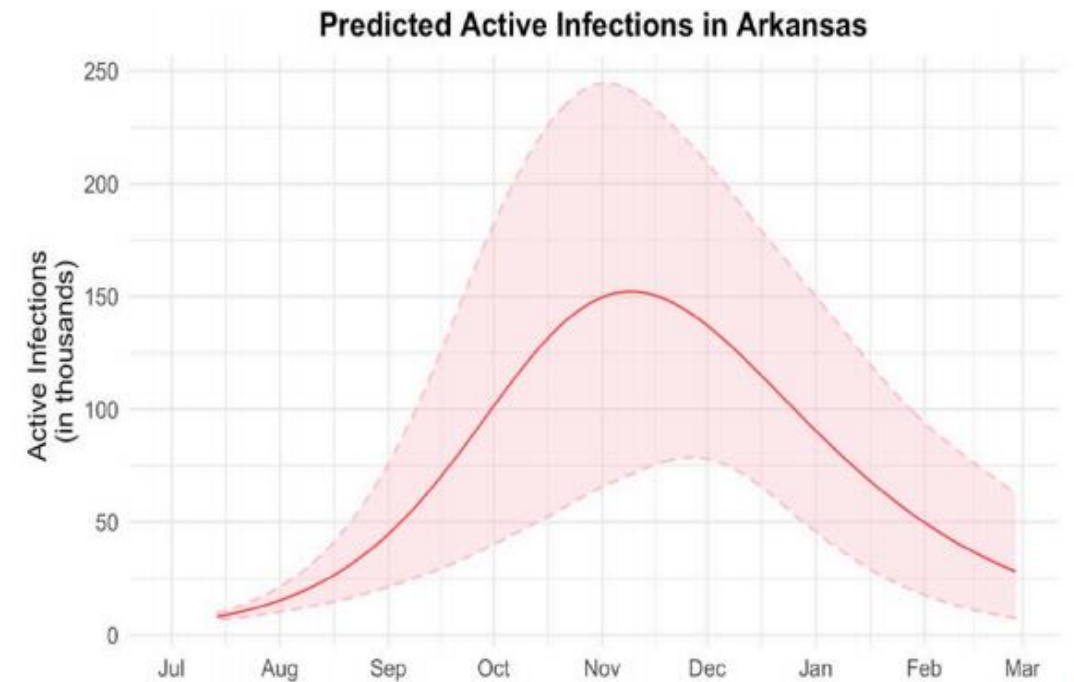
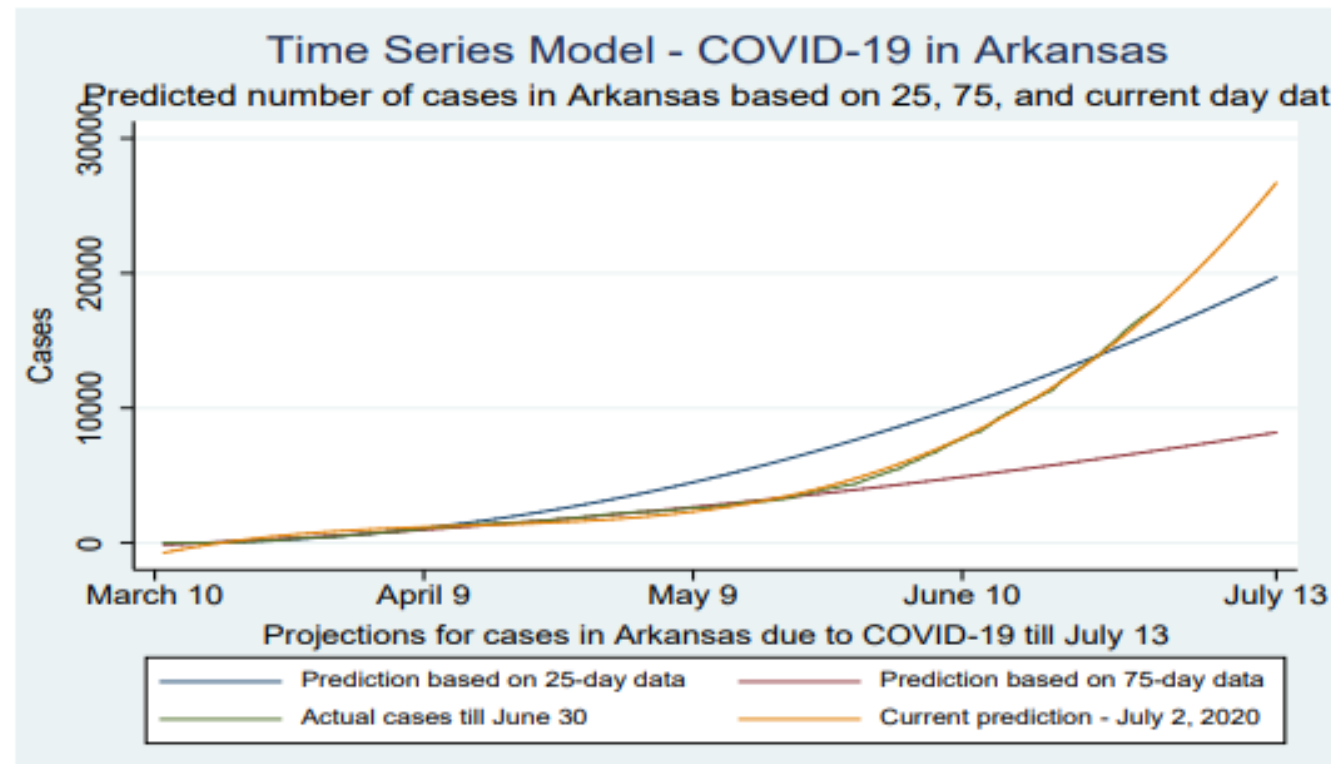
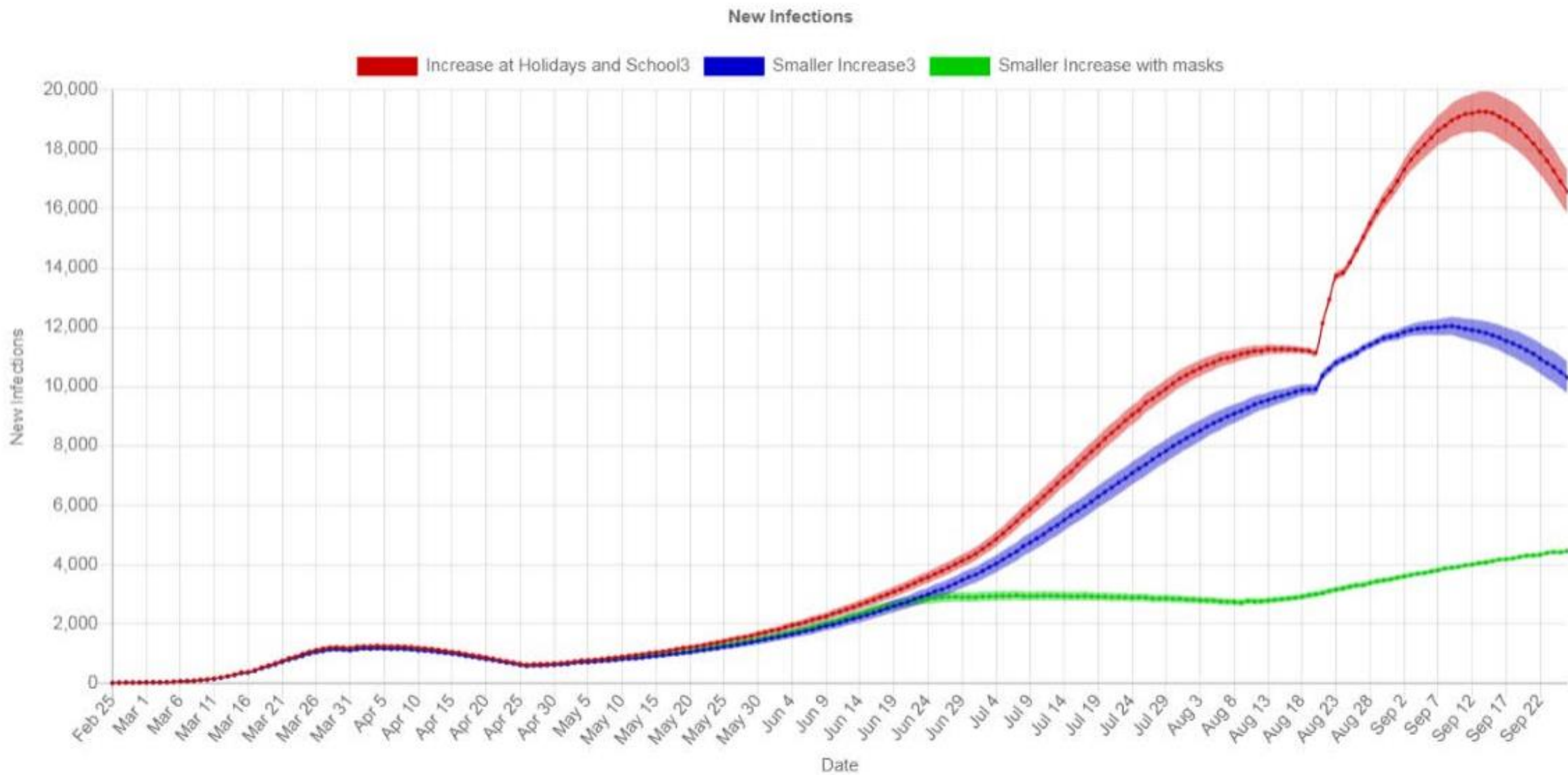


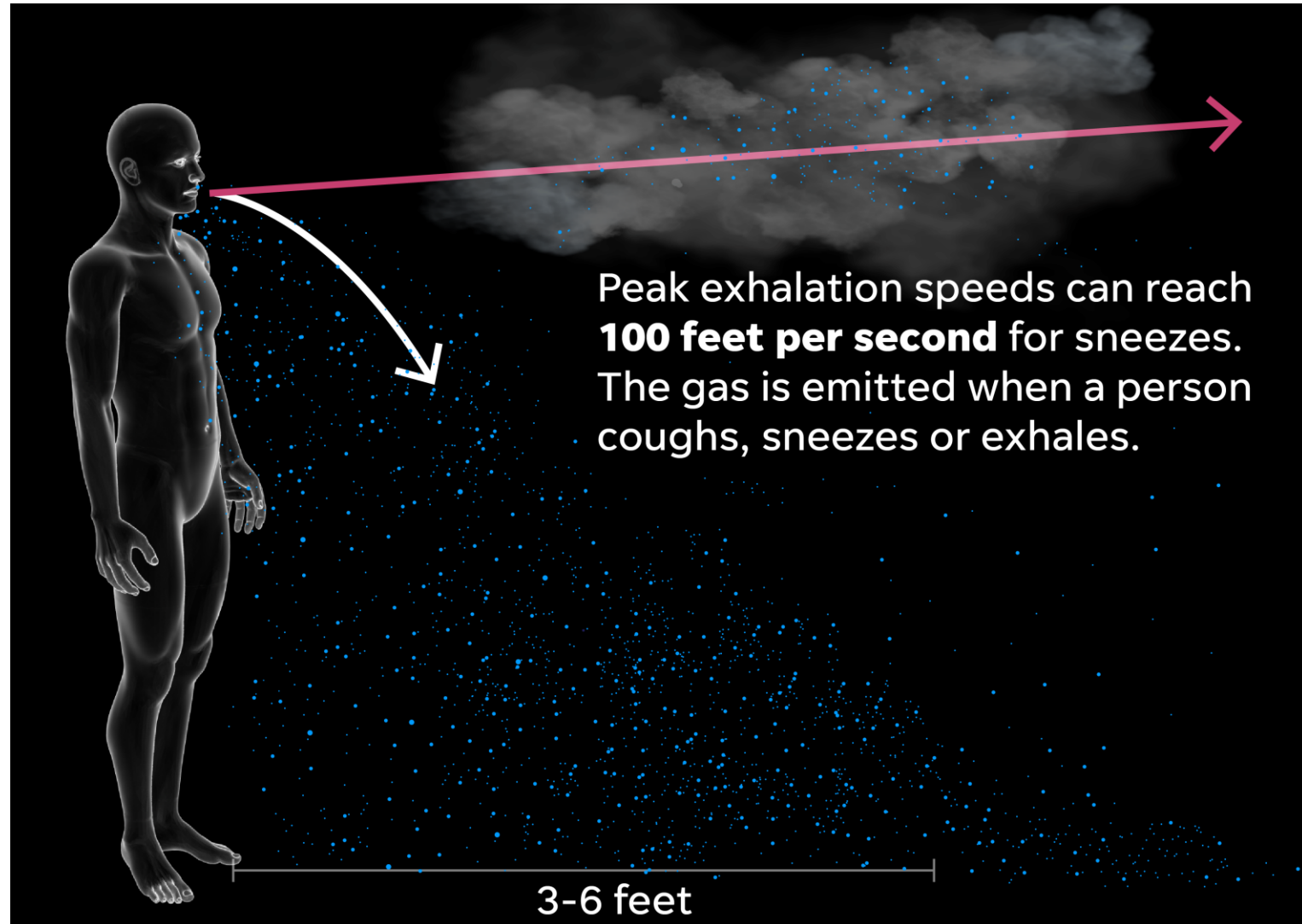
Fig 4: Mean estimate of predicted active infections for the state (solid curve), including asymptomatic infections, with 90% confidence intervals shown (shaded region between dotted lines). Note the date of the peak varies with the magnitude of the peak – more severe estimates peak sooner.

July 2, 2020 Simulation of New Infections:

New Infections



How does a mask work?



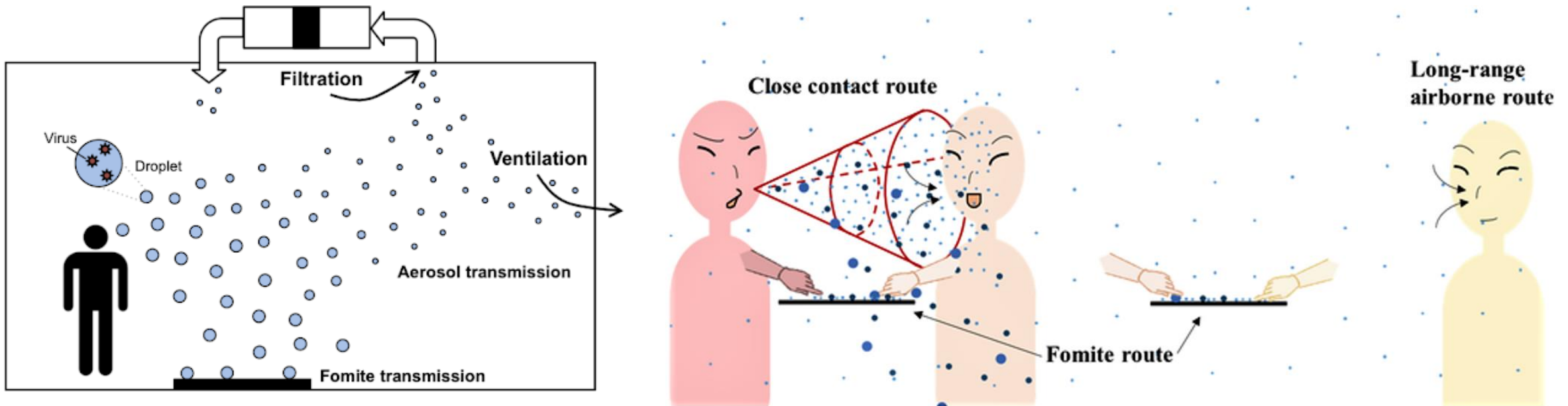
How Far Do Airborne Pathogens Travel?

	<u>Large</u> <u>Particulate</u>	<u>Droplet</u> <u>Nuclei</u>
Sneezing	8 - 15 ft 2.5 - 4 M	+160 ft +45 M
Coughing	1 - 5 ft 0.3 - 1.5 M	+160 ft +45 M
Talking	1 - 3 ft 0.3 - 1.0 M	+160 ft +45 M

*As a Result of Toilet Water Aerosolization and Mechanical Fan Dispersion into outdoor air (2003 Hong Kong SARS Virus Epidemic)

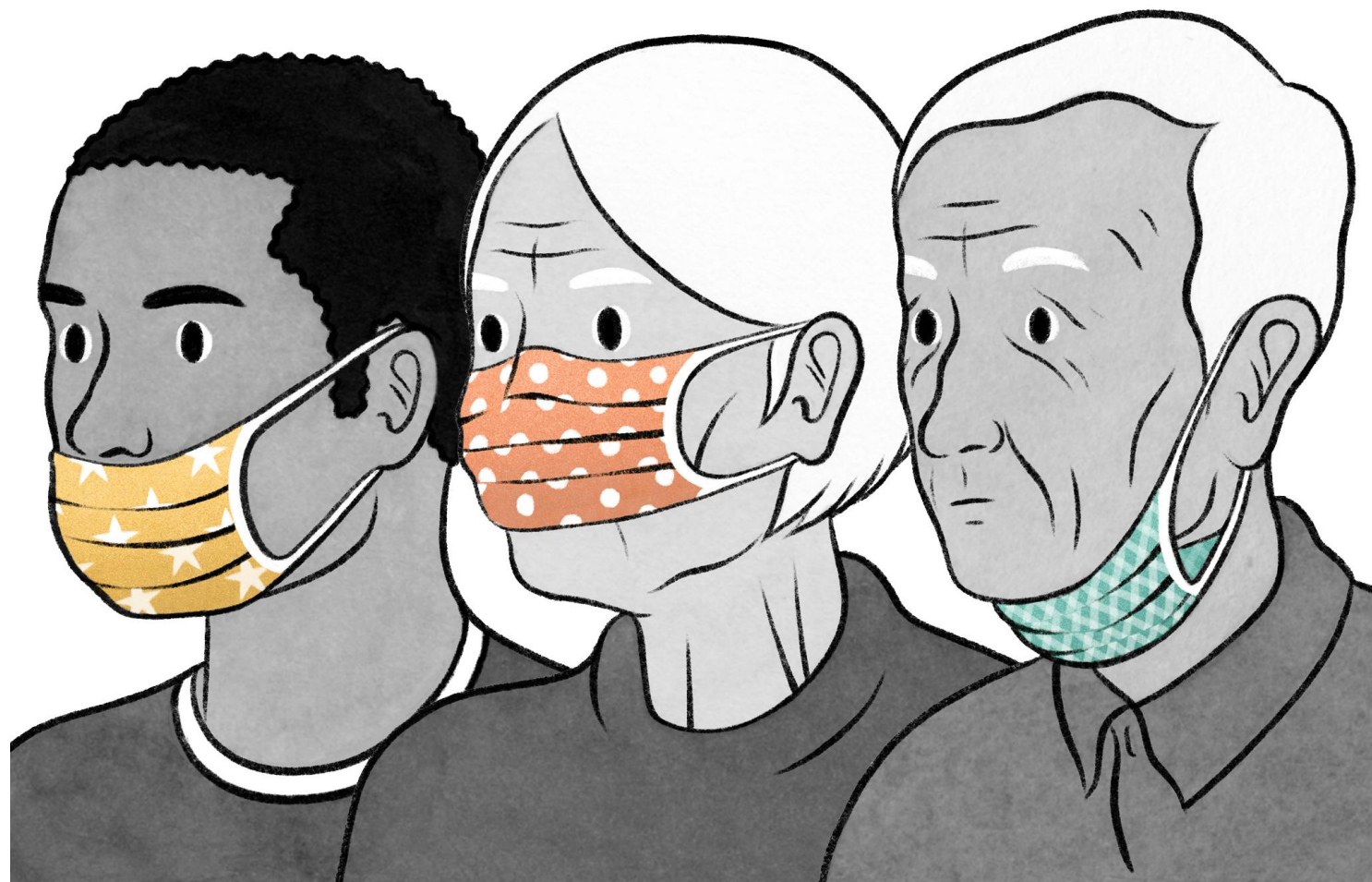
How does a mask work?

- How respiratory infections are Spread
 - Droplet Transmission vs. Aerosol (Airborne)



- Why does this matter?
 - Emerging evidence suggests COVID19 is spread both ways.
 - Research studies on masks differ based on what you're trying to prevent.

How a mask doesn't work.







Types of Masks



- Protection offered
 - Inward flow (protects the person wearing the mask from getting sick)
 - Outward flow (mask work by a sick person to protect those around them)
- Types of Masks
 - N95 – must be “fit tested”; primarily to protect the wearer from getting sick
 - Surgical Mask – universal fit; primarily to protect the wearer from getting sick
 - Cloth Masks – lots of variation in types of materials and layers
 - Silk, Cotton, Cotton Blend; primarily protects others from getting sick if the wearer is sick and doesn't know it; offer some protection to wearer.



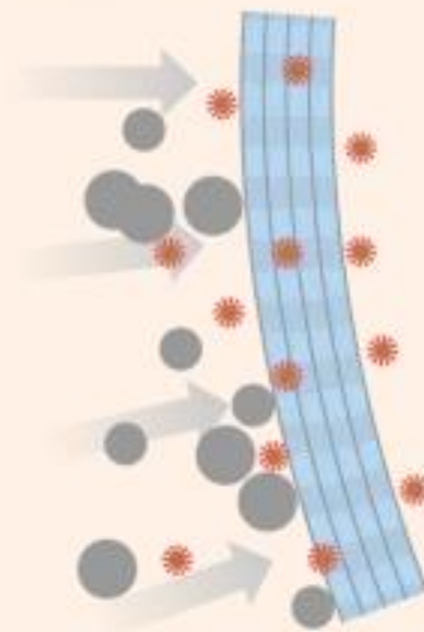
Effectiveness of different types of masks.

Sizes compared

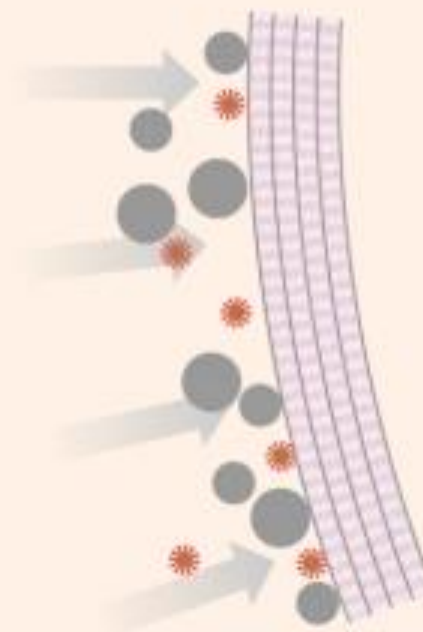


Cross-sections

Surgical mask



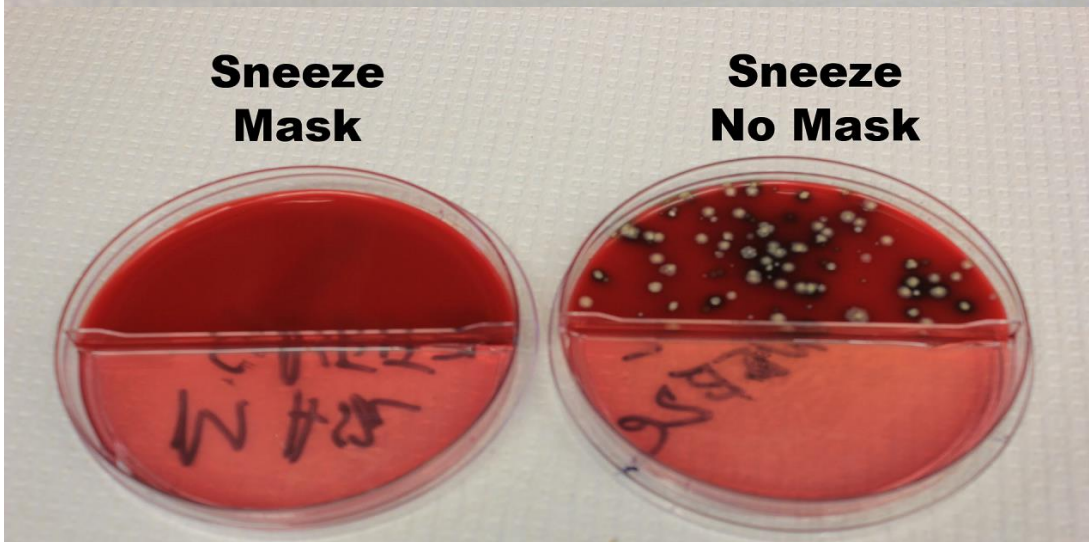
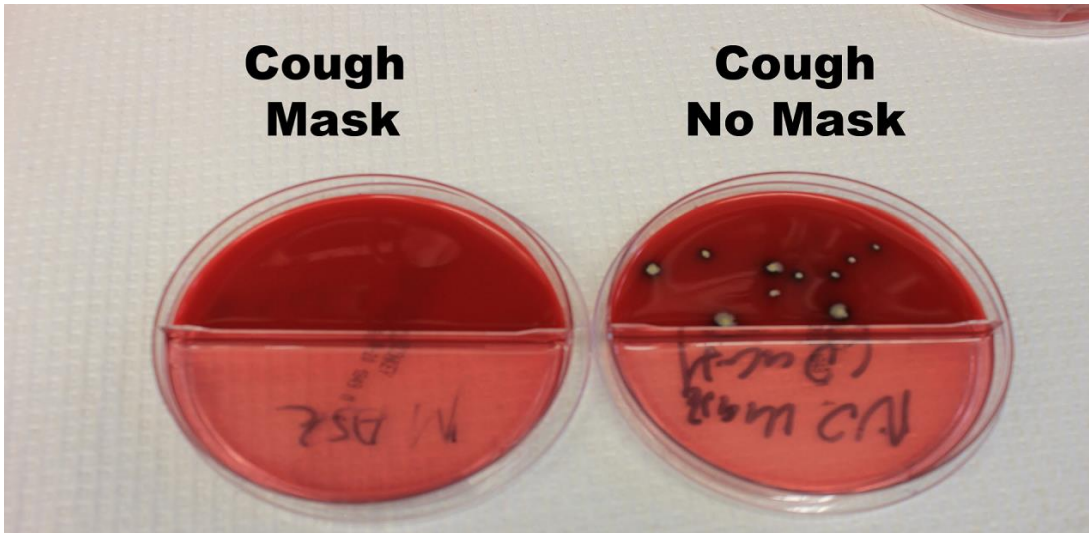
N95/FFP2 mask



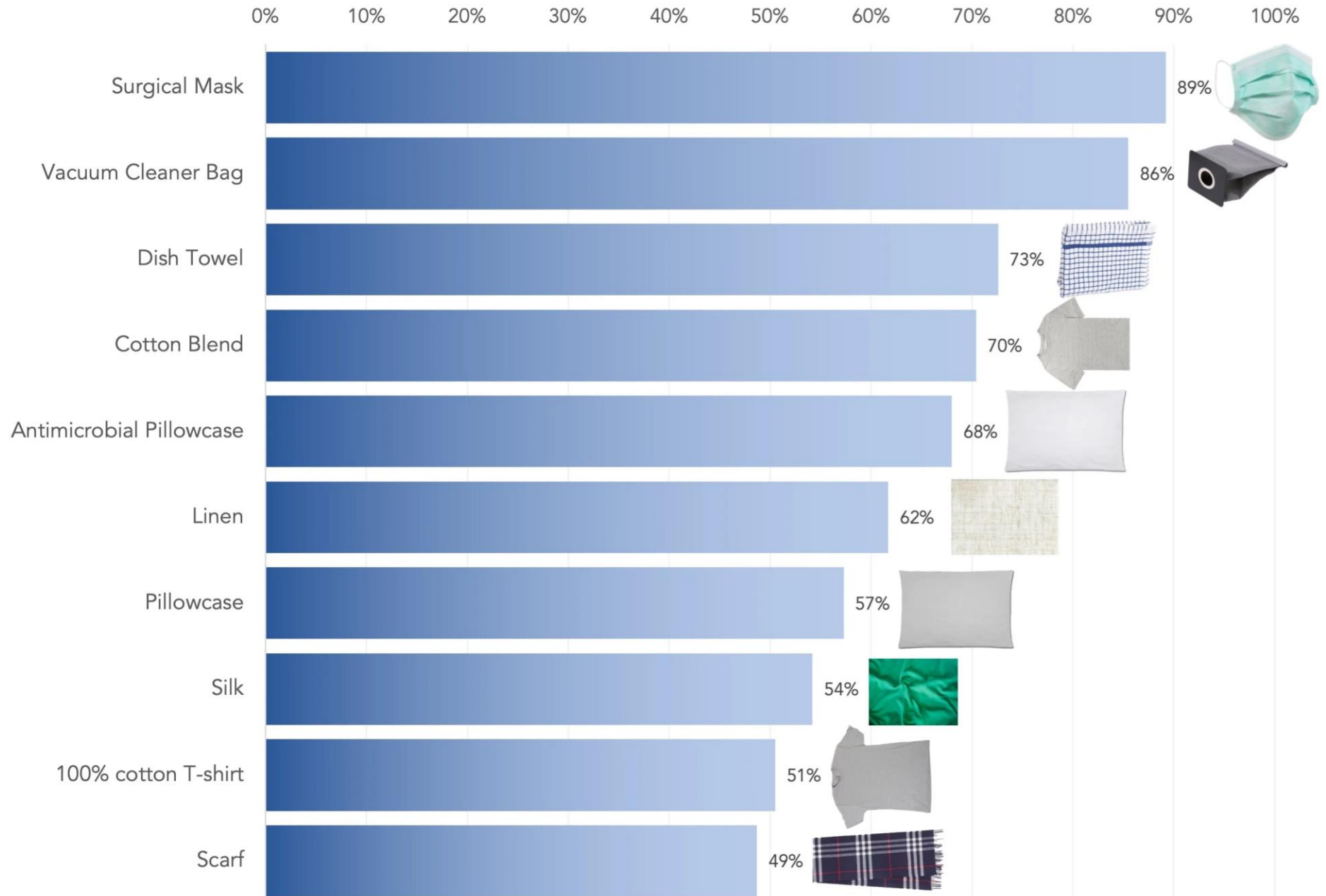
Sources: EPA; FT research
© FT

* Virus carried in larger droplets that eventually evaporate

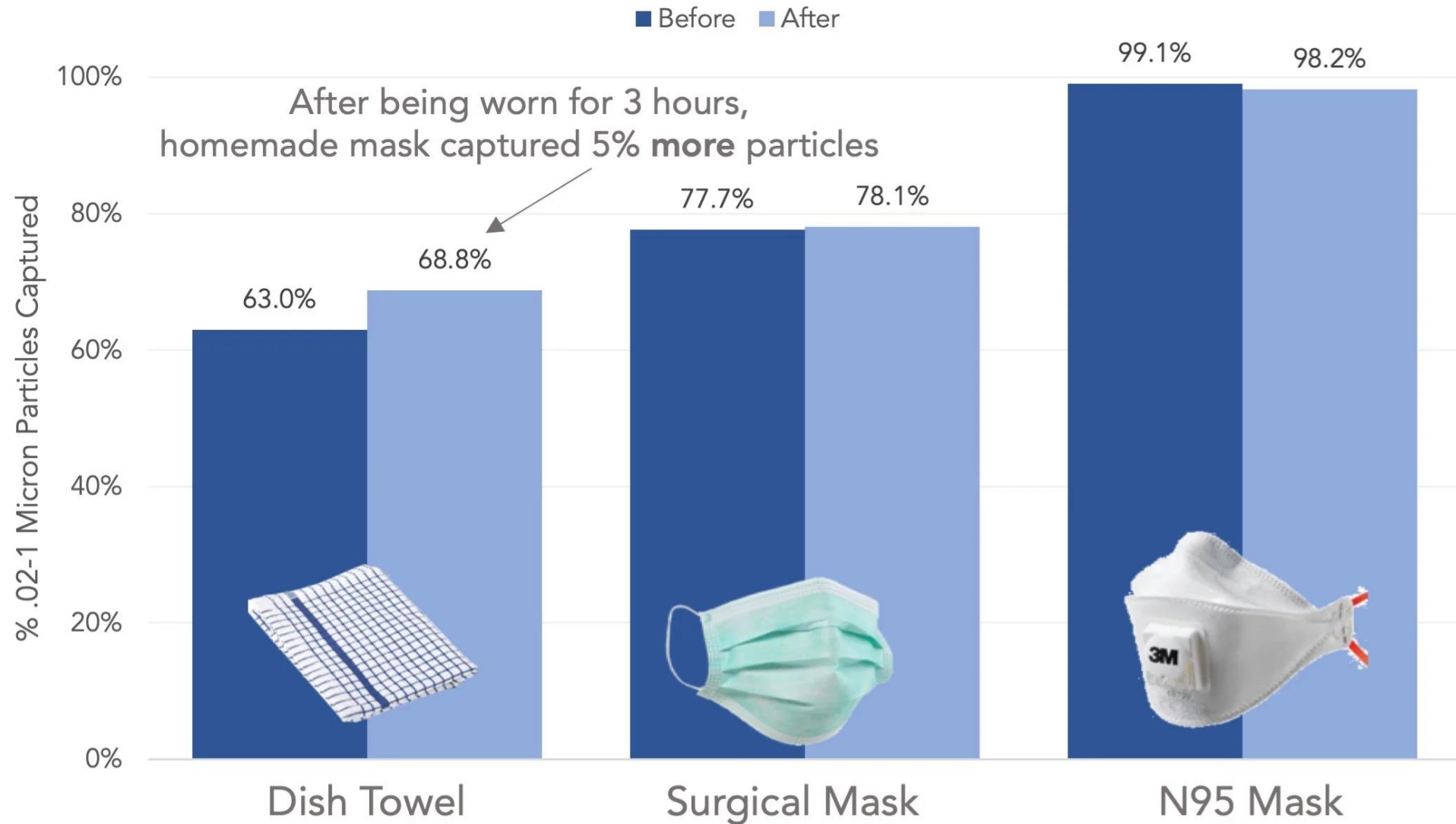
Effectiveness of different types of masks.



Household Materials' Effectiveness Against 0.02-Micron Particles



Mask Effectiveness Before and After 3 Hours



van der Sande et al., 2008.
PLoS One.

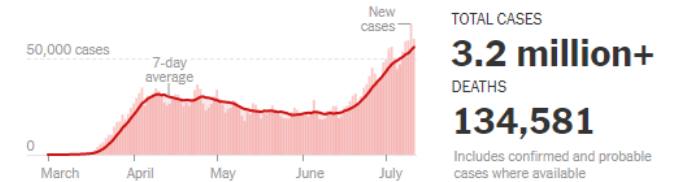
Open-data tests: Smart Air
smartairfilters.com

What are we seeing in other areas?

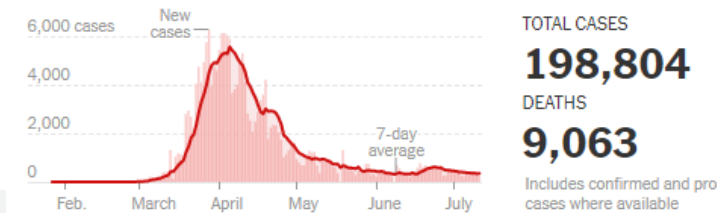
- Countries that mandate mask wearing in public
 - Germany, France, Italy, Spain, China, South Korea.
- States that mandate mask wearing in public
 - Since April: Connecticut, Delaware, Maryland, New Jersey, New York, Pennsylvania; 24 in total

By The New York Times Updated July 12, 2020, 8:04 A.M. E.T.

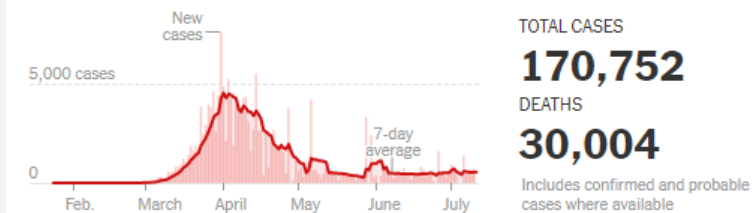
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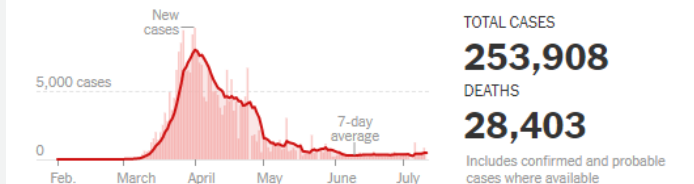
By The New York Times Updated July 12, 2020, 8:04 A.M. E.T.



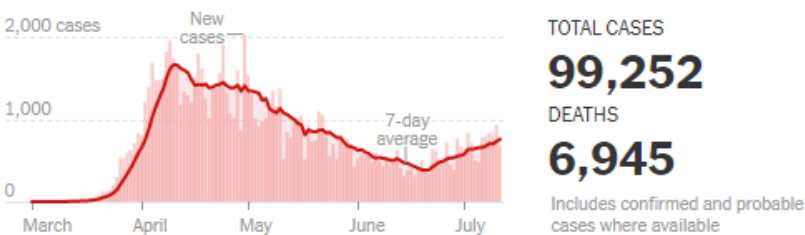
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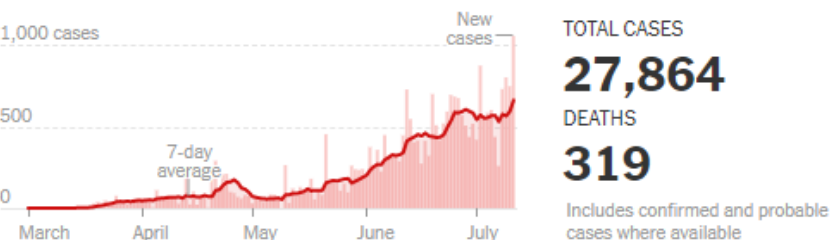
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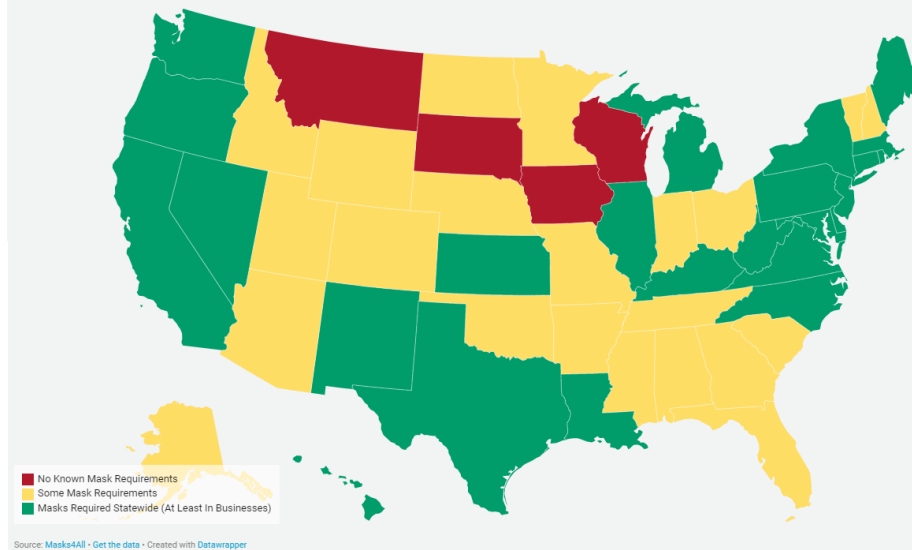


By The New York Times Updated July 12, 2020, 8:04 A.M. E.T.



What U.S. States Require Cloth Masks In Public Places?

Updated 7/11. 100+ countries require masks in public because almost every Government in the world endorses them as an effective COVID-19 containment solution.



What do the Experts say?

Updated June 28, 2020

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**World Health
Organization**

- CDC recommends that people wear cloth face coverings in public settings and when around people who don't live in your household, especially when other [social distancing](#) measures are difficult to maintain.
- Cloth face coverings may help prevent people who have COVID-19 from spreading the virus to others.
- Cloth face coverings are most likely to reduce the spread of COVID-19 when they are widely used by people in public settings.
- Cloth face coverings should NOT be worn by children under the age of 2 or anyone who has trouble breathing, is unconscious, incapacitated, or otherwise unable to remove the mask without assistance.

The WHO has new guidelines on face masks to fight Covid-19

The general public should wear cloth masks in public spaces where physical distancing is impossible, the agency says.

By Lois Parshley | Jun 6, 2020, 8:40am EDT

What do the Experts say?



Arkansas Department of Health

4815 West Markham Street • Little Rock, Arkansas 72205-3867 • Telephone (501) 661-2000
Governor Asa Hutchinson
Nathaniel Smith, MD, MPH, Secretary of Health

June 19, 2020

Guidance on the Use of Face Coverings by the General Public

Based on the above data, the ADH makes the following recommendations:

- **The general public should wear face coverings in all indoor environments where they are exposed to non-household members and distancing of 6 feet or more cannot be assured.** This includes, but is not limited to, workplaces (with few exceptions), retail stores, businesses, places of worship, courtrooms, jails and prisons, schools, healthcare facilities, other people's homes and all the scenarios addressed by the Governor's Directives.
- The general public should also wear face coverings at all outdoor settings where they are exposed to non-household members, unless there is ample space (6 feet or more) to practice physical distancing.
- Regarding the type of face covering, medical masks may be somewhat more protective than cloth masks (if they are clean and dry), but more and more evidence supports cloth masks as being sufficient for the general public and effective in preventing transmission. Cloth masks should consist of at least two layers of fabric. N95 respirators should be reserved for front-line health care workers.
- All face coverings should cover both the mouth and nose at all times in order to be effective.



Welcome to Journal Club

- Evaluating medical evidence and therapeutic research.
 - Levels of evidence
 - Level 1a – Systematic review of Randomized, Double Blind, Placebo Controlled Trials (RCT)
 - Level 1b – Individual RCT
 - Level 2a – Systematic review of cohort studies
 - Level 2b – Individual cohort study
 - Level 3a – Systematic review of case control studies
 - Level 3b – Individual case control study
 - Level 4 – Case series, low quality cohort or case control studies
 - Level 5 – Expert Opinion
 - Peer Reviewed; Disclosures of bias
- For this discussion, the date of the article matters (i.e. 2009 H1N1 pandemic)



What does the Evidence say?

- Journal of Infectious Disease Modeling; April 2020
 - *To mask or not to Mask: Modeling the potential face mask use by the general public to curtail the COVID-19 Pandemic*
 - Looked at models of cloth mask use by the Public
 - Statistical and mathematical models used based on current data
 - Estimated that 80% adoption of mask wearing by the population of masks that were 50% effective could prevent 17-45% of projected deaths in New York while decreasing the peak daily death rate by 34-58%.
- Journal of Disaster Medicine and Public Health Preparedness; August 2013
 - *Testing the Efficacy of Homemade Masks: Would They Protect in an Influenza Pandemic?*
 - Human participants (21); homemade mask, surgical mask, no mask
 - Tea Towel and cotton mix performed best for homemade (70-80%); surgical mask better (89-96%)
 - Bacterial test was similar in size (0.95-1.25 mcg) to influenza and COVID
 - Does not recommend for reduction of transmission of aerosols.
 - Homemade mask should only be considered as a last resort (in the absence of a N95 or surgical mask) to prevent droplet transmission from infected individuals, but it would be better than no protection.

What does the Evidence say?

- The Lancet; June 2020; Systematic Review
 - *Physical distancing, face masks, and eye protection to prevent person-to-person transmission of SARS-CoV-2 and COVID-19: a systematic review and meta-analysis*
 - 172 observational studies in 16 countries
 - Largely healthcare settings; N95 and Surgical Masks or similar
 - Quoted frequently; masks worn in healthcare and public settings would reduce transmission of virus
- ACS Nano; June 2020
 - *Aerosol Filtration Efficiency of Common Fabrics used in Respiratory Cloth Masks*
 - Cotton at higher thread count and Cotton + silk, chiffon, flannel
 - More than 80% efficient in filtering < 300 nm particle size
 - “Overall we find that combinations of various commonly available fabrics used in cloth masks can potentially provide significant protection against the transmission of aerosol particles.”
- Journal of Medical Virology; March 2020
 - *Potential Utilities of Mask-Wearing and Instant Hand Hygiene for Fighting SARS-CoV-2*
 - N95, Surgical mask, homemade mask
 - 99.98%, 97.14%, 95.15% blocking of virus in a lab setting (simulated breathing)
- PLOS One; July 2008
 - *Professional and Home-Made Face Masks Reduce Exposure to Respiratory Infections among the General Population*
 - Experimental study; Evaluated N95, Surgical Mask, Homemade mask
 - All showed efficacy on inward and outward protection (N95 was the highest; surgical and homemade were largely the same)

What does the Evidence say?

- International Journal of Infection Control; 2013
 - *Use of Cloth Masks in the practice of infection control*
 - Looked at 19 different laboratory and observational studies
 - Cloth masks shouldn't be used in the hospital or clinic to protect workers
 - Not a lot of evidence one way or the other. The article assumed cloth masks would be used in 3rd world countries, not developed countries (U.S.)
 - Many variables in the type of cloth mask used and protection offered.
 - Multiple layers of cotton were most effective and offered most protection.
- Annals of Occupational Hygiene; June 2010
 - *Evaluation of the Filtration Performance of Cloth Masks and Common Fabric Materials Against 20-1000 nm Size Particles*
 - Looked at use of cloth masks during an influenza pandemic when respirators (N95) were in short supply.
 - Cloth mask (commercial), sweatshirt, T-shirt (100% cotton), Towel, Scarf
 - May provide some level of protection from aerosolized infections (70/30 sweatshirt was best)
 - Droplet protection not investigated

What does the Evidence say?

- Proceedings of the National Academy of Sciences of the United States of America (PNAS)
 - *Face Masks Against COVID-19: An Evidence Review; April 2020*
 - A literature review for policymakers on public mask wearing.
 - Referenced 96 different research articles and publications
 - Looked at: aerosolized vs. droplets; filtration rates of different materials; use in other countries during pandemics and epidemics
 - “Our review of the literature offers evidence in favor of widespread mask use to reduce community transmission; non-medical masks use materials that obstruct droplets of the necessary size; people are most infectious in the initial period post-infection, where it is common to have few or no symptoms; non-medical masks have been effective in reducing transmission of influenza; non-medical masks have been shown to be effective in small trials blocking the transmission of coronavirus; and places and time periods where mask usage is required or widespread have shown substantially lower community transmission.”

What does the Evidence say?

- Health Affairs

- *Evidence From a Natural Experiment Of State Mandates In The U.S.; June 2020*

- Looked at the changes in daily county level COVID-19 infections between March 31, 2020 and May 22,2020 in U.S. states that mandated mask wearing in public.
 - Noted a 2% reduction of new cases by day 21 with continued decline after the study period.
 - Worked in combination with other measures (social distancing, limited gatherings, school closures) to lower the daily number of infections.

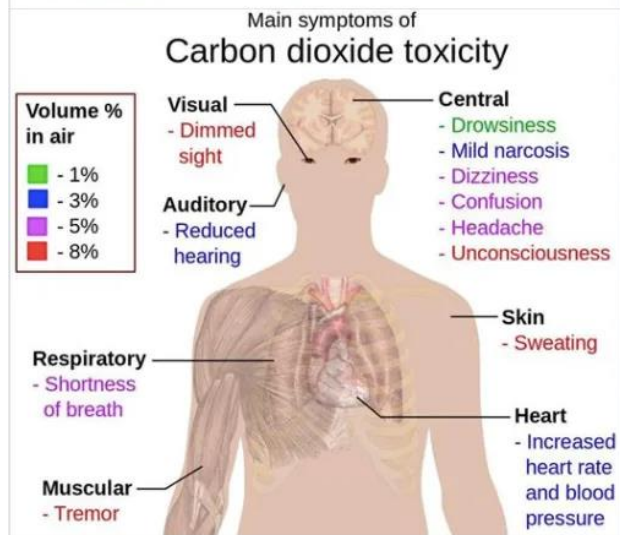
MASK WEARING

- Reduces oxygen up to 60%
- Increases risk of CO2 poisoning.
- Causes increased face touching.
- Virus & bacteria saturate the inside.
- Touching mask and surfaces spreads germs.
- Contaminants sit within mask fibers, get reinhaled.
- Fresh air is vital for immune health!

Most Common Comments

- “We” said not to wear masks in the beginning and now “we” are saying we should be?
 - Yes, two reasons
 - 1) Didn’t want the supply of N95’s and surgical masks to become critically low
 - 2) The American public was not ready to adopt it with number of cases
- “Masks lower the oxygen level of your blood.”
 - Oxygen (O2) is a molecule is 1,000 times smaller than a virus, it passes right through the cloth mask.
- “Masks increase the carbon dioxide of your blood.”
 - Cloth masks are not air tight; CO2 escapes around the edges of the mask or passes through.
- “Masks increase the amount of virus a sick person breathes in making them sicker.”
 - Once you’re sick, you’re sick. You can’t increase the severity of your sickness by reinfecting yourself.

This is Hypercapnia. It can be caused by rebreathing your own exhaled CO2 by wearing a mask continually.



DANGER OF FACEMASK

Mask is supposed to be used for limited time, if you wear it for a long time :

1. Oxygen in the blood reduces.
2. Oxygen to the brain reduces.
3. You start feeling weak.
4. May lead to death.

• NO EVIDENCE

in their car with AC on still wearing face Mask. Ignorance or illiteracy?

B. Do not use it at home.

C. Only use in crowded place and when in close contact with one or more persons.

D. Reduce the use of it while isolating yourself most of the times.

STAY SAFE

Hypercapnia. It can be caused by your own exhaled CO2 by wearing continually.

Main symptoms of carbon dioxide toxicity

Visual
- Dimmed sight

Auditory
- Reduced hearing

Muscular
- Tremor

Central
- Drowsiness
- Mild narcosis
- Dizziness
- Confusion
- Headache
- Unconsciousness

Skin
- Sweating

Heart
- Increased heart rate and blood pressure

Respiratory
- Shortness of breath

Main Points

- How did we even get here?
 - No one envisioned a global pandemic where the N95 mask that could be purchased in at Lowes or Home Depot would be in short supply for U.S. hospitals leaving the public to look for other means of protection.
 - The scientific and medical profession took for granted the public would trust their collective advice.
- Cloth masks offer some protection to the wearer, but primarily the person wearing a cloth mask is protecting others in case they are sick and don't know it yet.
- Wearing a mask is not in place of social distancing, it is in addition to (i.e. 6 feet apart, reduce time spent in closed spaces, refrain from large gatherings, etc.)

CDC, ADH, WHO, and a preponderance of experts in medicine and research

If the majority of the population committed to wearing a mask of any type (N95, surgical, or cloth*) while in public, it would significantly reduce the number of COVID19 infections, hospitalizations, and deaths in our community.

*type of material used to make the mask matters

Why is this a big deal and what difference can a mask really make?

- The potential to slow the spread and reduce the number of people that get infected, hospitalized, or die.
 - UAMS School of Public Health – July 3, 2020 report on projected cases for the state of Arkansas.

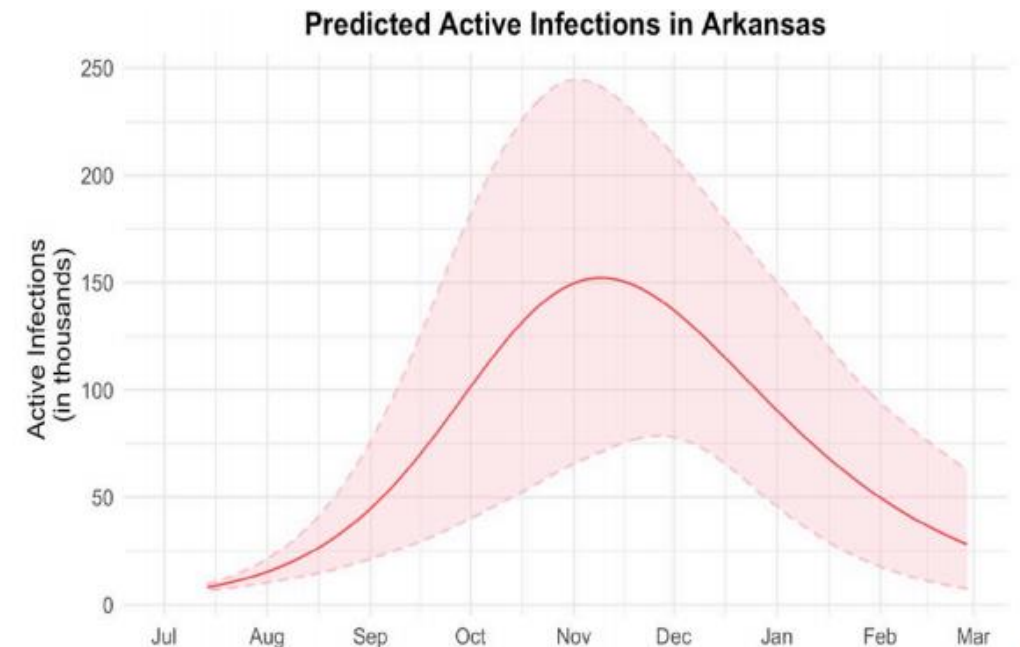
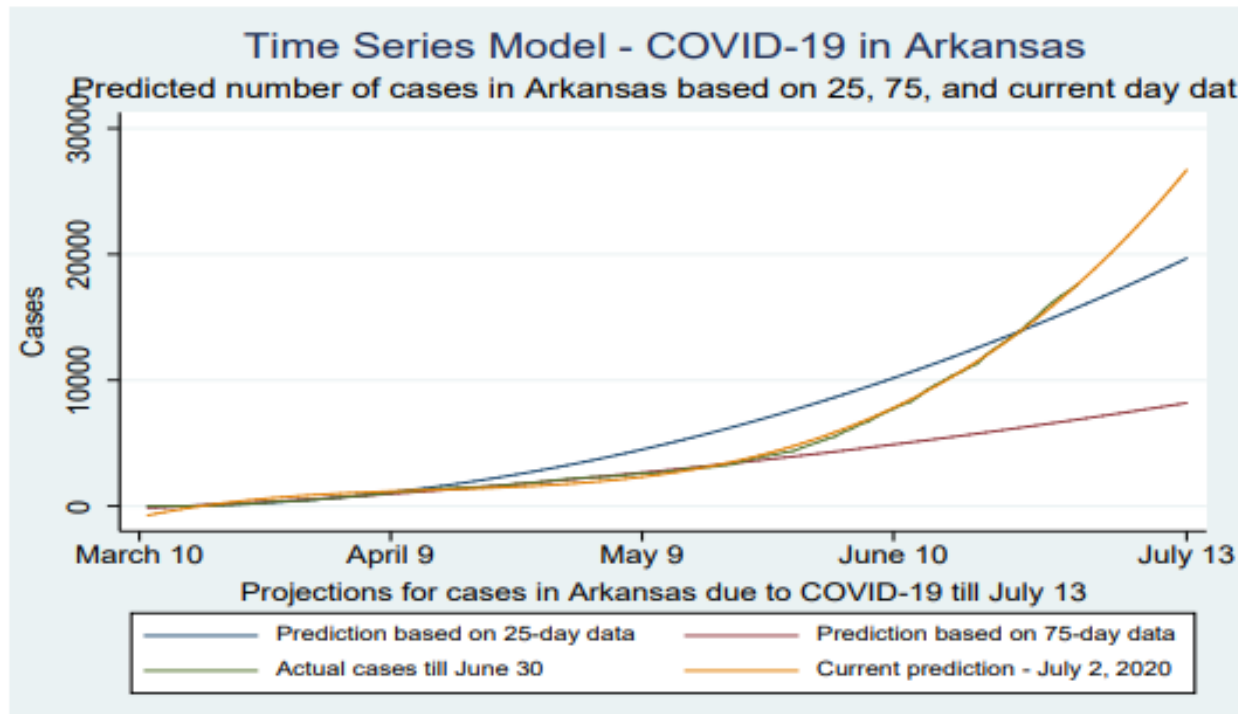


Fig 4: Mean estimate of predicted active infections for the state (solid curve), including asymptomatic infections, with 90% confidence intervals shown (shaded region between dotted lines). Note the date of the peak varies with the magnitude of the peak – more severe estimates peak sooner.

Masks: It's Complicated

Wading through fact and fiction.