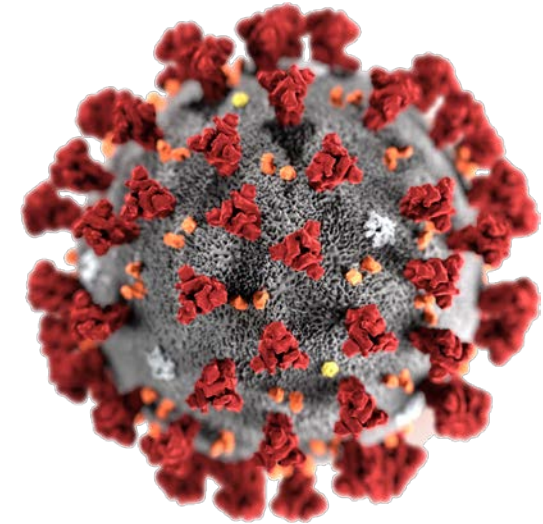


Coronavirus updates

OCTOBER 27, 2020



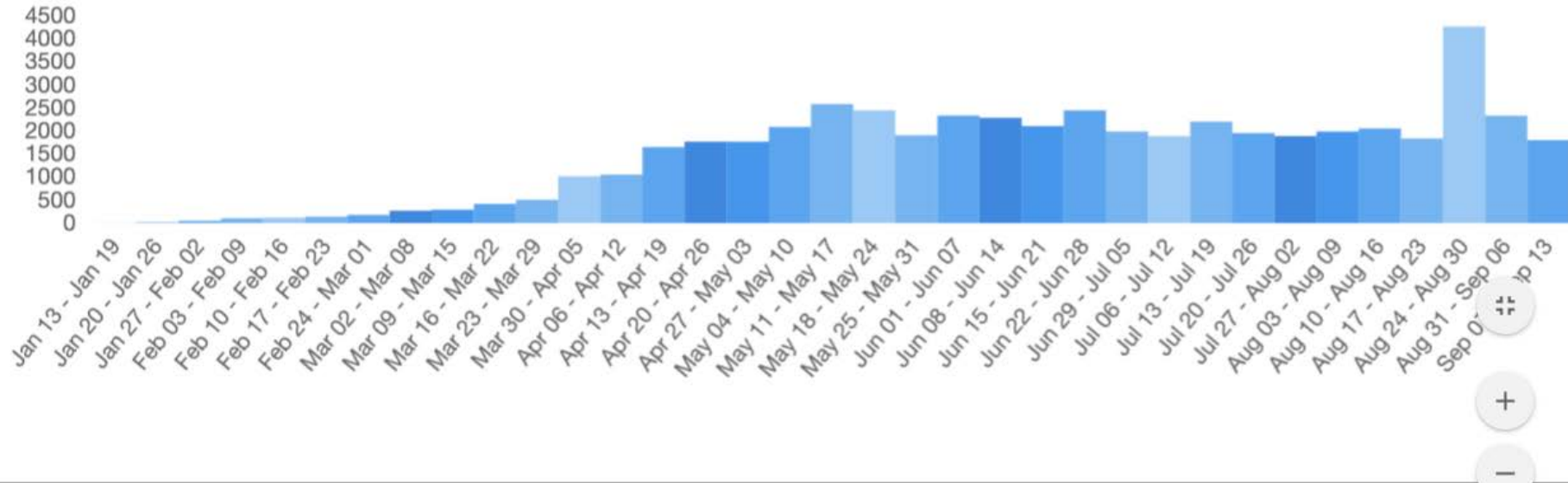


OVERLOAD!

Research and Publication in COVID-19

- As of 9/14/20, LitCOVID lists 51,785 scientific publications on COVID-19
- Since March, 2020 articles have been accumulating at a rate of > 1000 week

Weekly Publications





COVID-19 Dashboard by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University (JHU)

Global Cases

43,571,756

Cases by
Country/Region/Sovereignty

8,705,127 US

7,946,429 India

5,409,854 Brazil

1,537,142 Russia

1,209,651 France

1,102,301 Argentina

1,098,320 Spain

1,025,052 Colombia



Esri, FAO, NOAA

Global Deaths

1,160,421

225,739 deaths
US

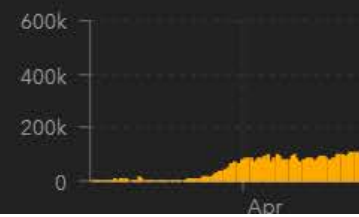
157,397 deaths
Brazil

119,502 deaths
India

89,171 deaths
Mexico

Global Deaths

- Cumulative Cases
- Active Cases
- Incidence Rate
- Case-Fatality Ratio
- Testing Rate



Admin0

NM UPDATES

JOHNS HOPKINS
UNIVERSITY & MEDICINE

CORONAVIRUS
RESOURCE CENTER

<https://coronavirus.jhu.edu/>

JOHNS HOPKINS
UNIVERSITY & MEDICINE

CORONAVIRUS
RESOURCE CENTER

State New Mexico

New Cases

New daily cases



+823 new

Weekly trend

THIS
WEEK

LAST
WEEK



Tests per
1,000 people

Daily Tests



4.2 tests per 1,000

Weekly trend

THIS
WEEK

LAST
WEEK



Percent
Positive

Daily % positive



7.5% positive

Above threshold?

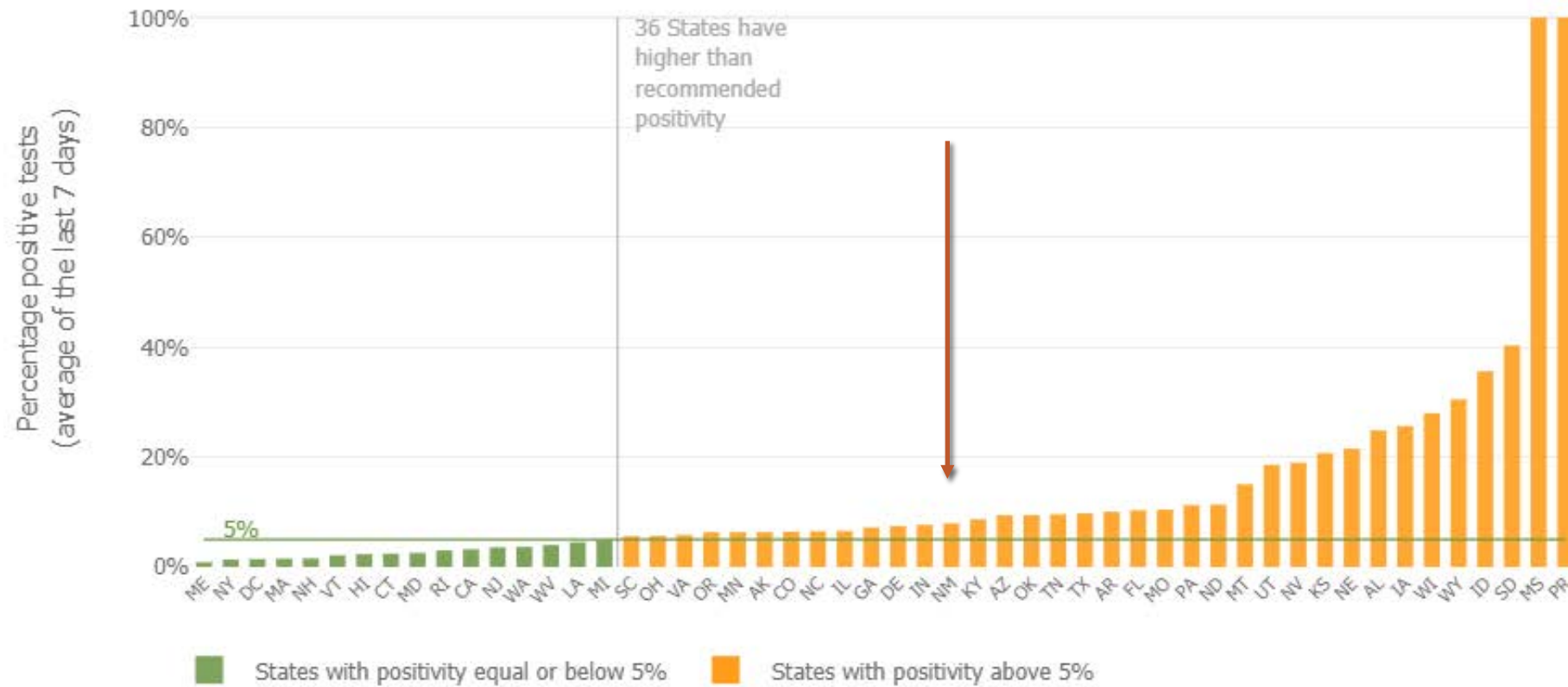
THIS
WEEK

LAST
WEEK



This graphic was last updated on
Monday, October 26, 2020 at 03:00 AM EDT.

Test positivity



RECENT OPENING AND CLOSING POLICY DECISIONS

● Restriction/closing ● Opening ● Deferring decisions to county ● Other

← Previous 🔍 Next →

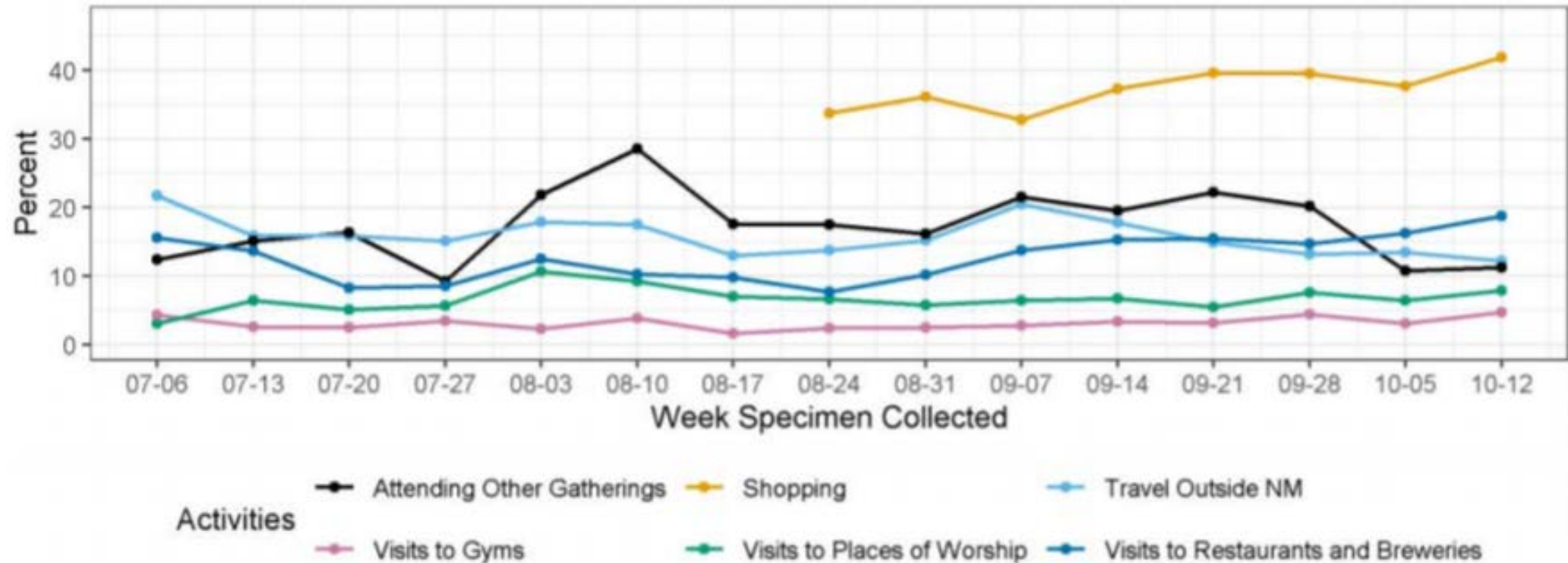


Aug 27, 2020

24,920 CUMULATIVE CASES | 764 CUMULATIVE DEATHS

- The Governor announced revised emergency public health order that permitted certain relaxations of occupancy restrictions

Percent of Investigated Cases Reporting Activities



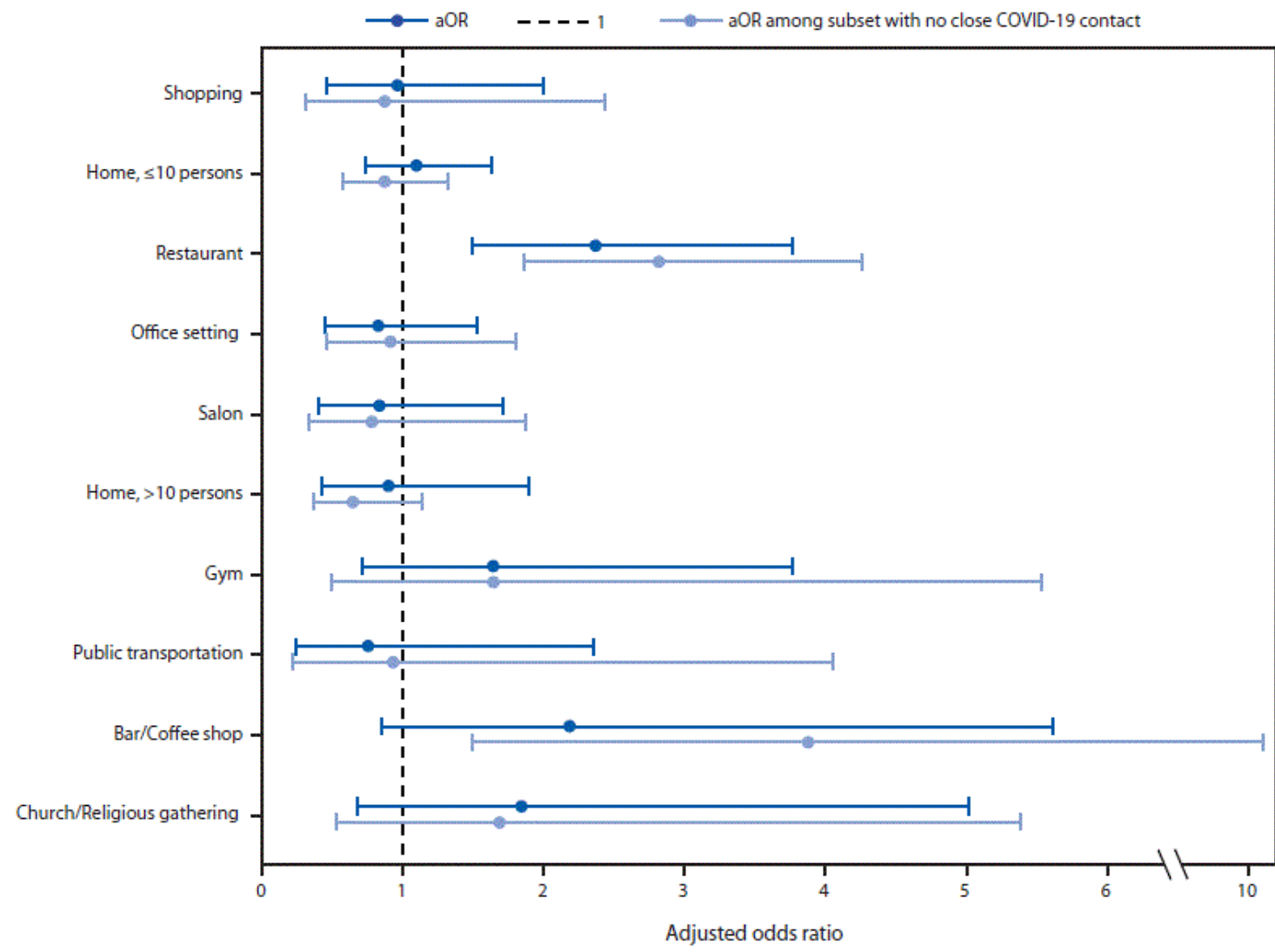
Source: NM Department of Health. Cases in correctional facilities and residents of long-term care facilities were excluded. Percentages are out of cases who were contacted and asked about their exposures 14 days prior to illness onset or positive test result. Previous published reports did not always include 14 days prior to illness onset or positive test result, or Shopping as an activity. Gatherings here include any activity with 5 or more individuals, family gatherings, widespread community activities, and civic action.

Community and Close Contact Exposures Associated with COVID-19 Among Symptomatic Adults ≥ 18 Years in 11 Outpatient Health Care Facilities — United States, July 2020

- ❖ 314 people enrolled -> 154 cases and 160 controls
- ❖ participants with and without COVID-19 reported generally similar community exposures EXCEPT . . .
- ❖ Case-patients were more likely to have reported dining at a restaurant (any area designated by the restaurant, including indoor, patio, and outdoor seating) in the 2 weeks preceding illness onset than were control-participants

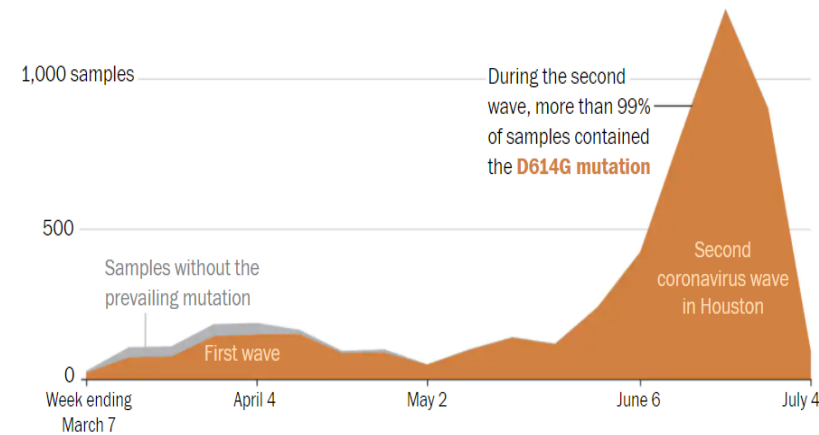
MMWR. September 11, 2020 / 69(36);1258–1264

<http://dx.doi.org/10.15585/mmwr.mm6936a5>



COVID-19 Virus Mutations

- Study of more than 5000 COVID-19 genetic mutations from samples through 2 waves in Houston, TX
- Primary identified mutation is a change of amino acid on spike protein from aspartic acid (D) to Glycine (G) at position 614
- First wave, D614G variant = 71%
- Second wave, D614G variant = 99.9%
- Patients infected with D614G variant had higher levels of virus in their NP secretions, but there was no increased morbidity or mortality
- Demonstrated evidence of selective advantage



Source: Houston Methodist Research Institute

medRxiv 2020.09.22.20199125; doi: <https://doi.org/10.1101/2020.09.22.20199125>

Prevention Updates

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 across 16 countries and six continents health-care and non-health-care settings (n=25 697 patients).
- Transmission of viruses was lower with physical distancing of 1 m or more; protection was increased as distance was lengthened
- Face mask use could result in a large reduction in risk of infection; with stronger associations with N95 or similar respirators compared with disposable surgical masks or similar
- Eye protection also was associated with less infection

- Unadjusted studies and subgroup and sensitivity analyses showed similar findings.

[https://doi.org/10.1016/S0140-6736\(20\)31142-9](https://doi.org/10.1016/S0140-6736(20)31142-9)

Masks

Evidence that wearing masks can decrease disease severity

Japanese cruise

- February (no masks)
- > 80% symptoms

Argentinian cruise

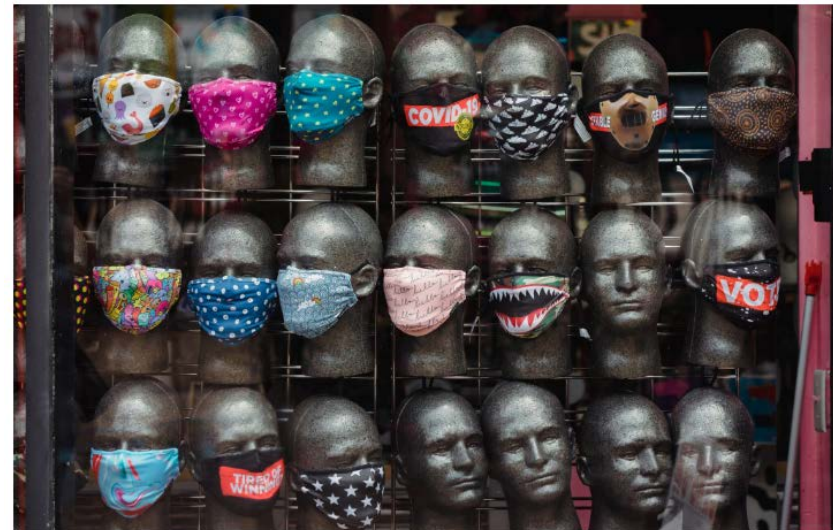
- March (masks required)
- <20% symptoms

Oregon Seafood Plant

- Masks required
- 1/3 of employees tested +
- 95% asymptomatic

Masks May Reduce Viral Dose, Some Experts Say

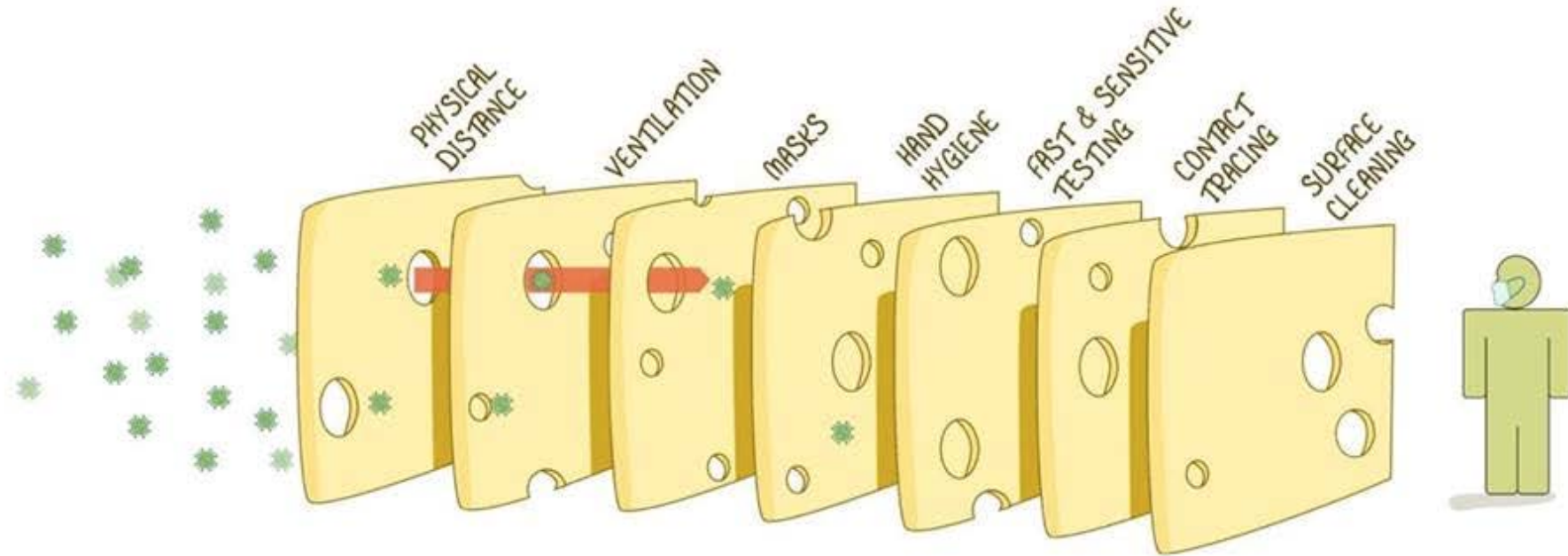
People wearing face coverings will take in fewer coronavirus particles, evidence suggests, making disease less severe.



Face masks on display in a store in the Little Five Points neighborhood of Atlanta. Dustin Chambers for The New York Times

THE SWISS CHEESE RESPIRATORY VIRUS DEFENCE

RECOGNISING THAT NO SINGLE INTERVENTION IS PERFECT AT PREVENTING SPREAD

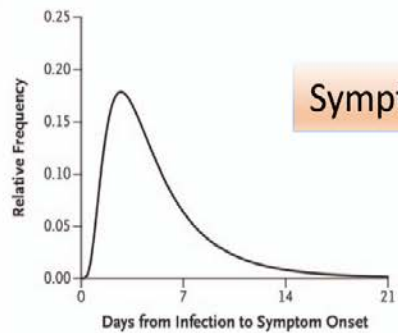
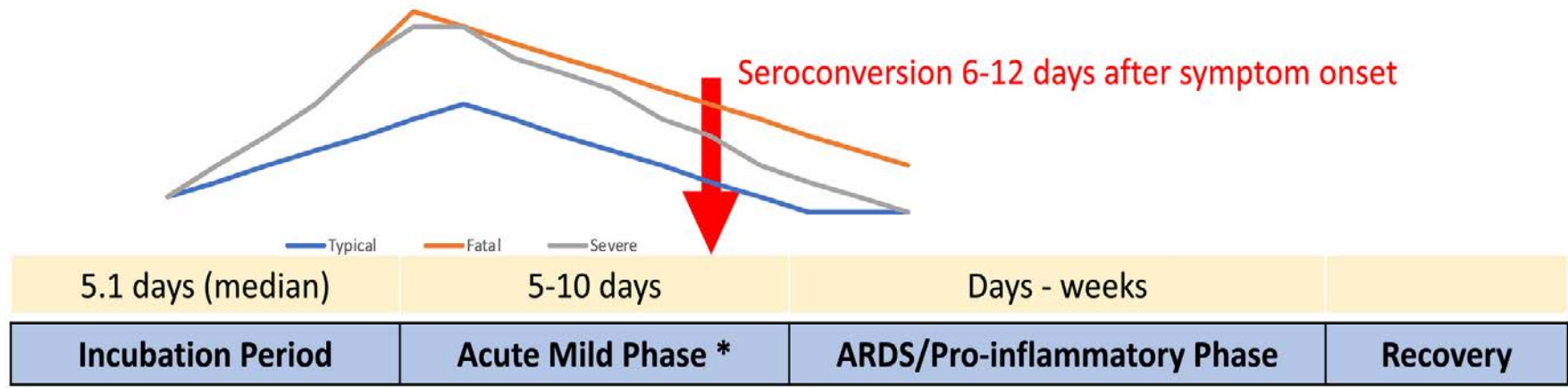


EACH INTERVENTION (LAYER) HAS IMPERFECTIONS (HOLES).
MULTIPLE LAYERS IMPROVE SUCCESS.

TAN M MACKEY
VIOLOGYDOWNUNDER.COM
DERIVED FROM @SKETCHPLANNATOR
BASED ON THE SWISS CHEESE MODEL OF ACCIDENT CAUSATION, BY JAMES T REASON, 1990
VERSION 1.3
UPDATE: 12OCT2020

COVID-19 Illness Course

SARS-CoV-2 Respiratory Viral RNA Load



Symptom onset

Hallmarks: dyspnea, tachypnea, hypoxemia

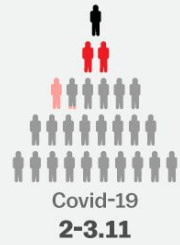
* Acute Mild Phase: nonspecific symptoms. Most commonly fevers, cough, myalgias, fatigue. Nausea, diarrhea reported <50% of the time

Pan Lancet ID 2020 [https://doi.org/10.1016/S1473-3099\(20\)30113-4](https://doi.org/10.1016/S1473-3099(20)30113-4)
 Zou NEJM 2020 DOI: 10.1056/NEJMc2001737
 Zhou Lancet 2020 [https://doi.org/10.1016/S0140-6736\(20\)30566-3](https://doi.org/10.1016/S0140-6736(20)30566-3)
 Li NEJM 2020 DOI: 10.1056/NEJMoa2001316

Wang JAMA 2020 doi:10.1001/jama.2020.1585
 Siddiqi JHLT 2020 doi:10.1016/j.healun.2020.03.012
 Wolfel Nature doi:10.1038/s41586-020-2196-x

How contagious is a disease?

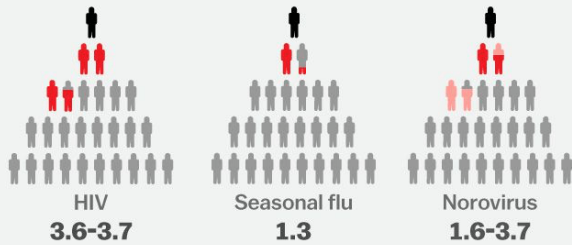
Scientists use "R naught," or R_0 , to estimate how many other people one sick person is likely to infect



*This estimate is preliminary and likely to change



*An early estimate based on the Colombia outbreak in 2015



*An estimate based on Réunion Island in 2006

SOURCES: Travel Medicine, PLOS One, JAMA Pediatrics, MDPI, NCBI, New England Journal of Medicine, "The Spread and Control of Norovirus Outbreaks Among Hospitals in a Region"

Vox

Javier Zarracina and Christina Animashaun/Vox

Covid Essentials – R_0

"R naught"

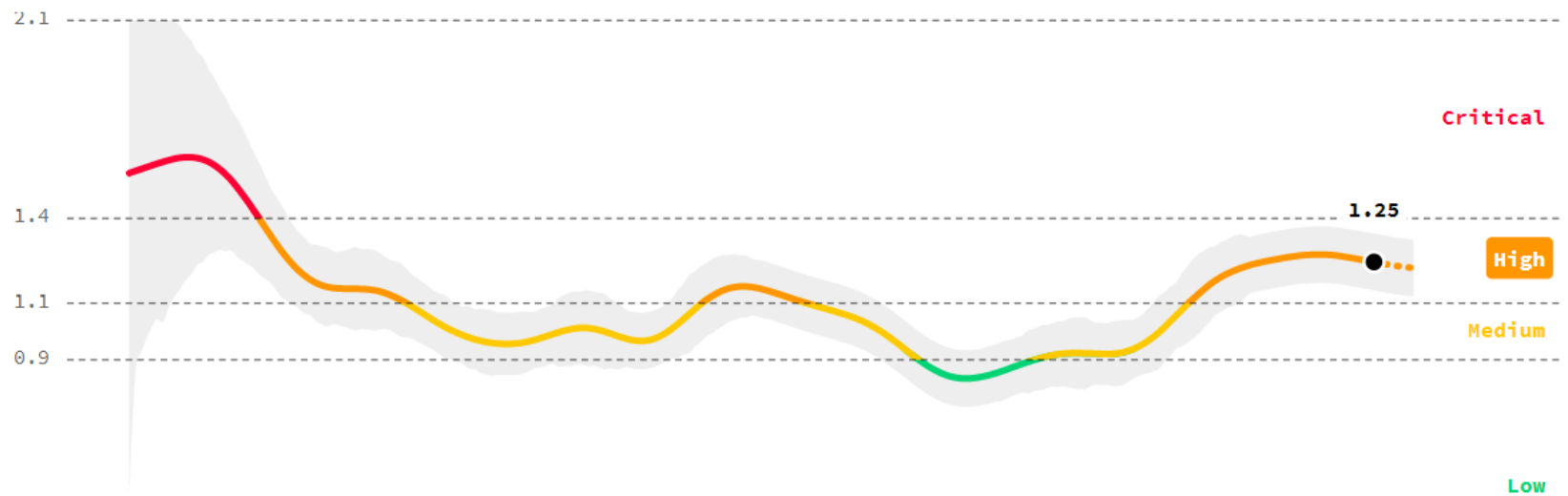
“R” value

Infection rate

NEW MEXICO

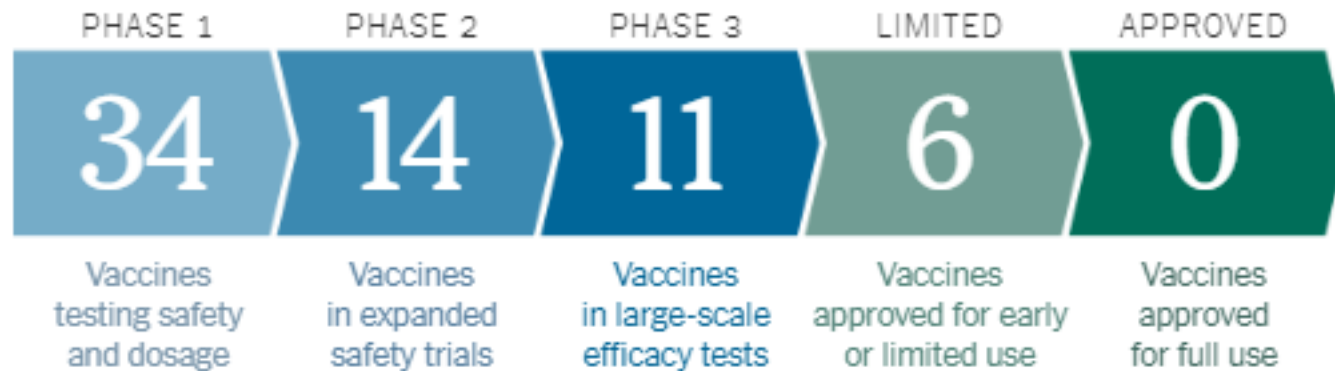
[Save](#) [Share](#)

On average, each person in New Mexico with COVID is infecting 1.25 other people. As such, the total number of active cases in New Mexico is growing at an unsustainable rate. If this trend continues, the hospital system may become overloaded. Caution is warranted.



Coronavirus Vaccine Tracker

By Jonathan Corum, Sui-Lee Wee and Carl Zimmer Updated October 26, 2020



Vaccine Update

[HTTPS://WWW.NYTIMES.COM/INTERACTIVE/2020/SCIENCE/CORONAVIRUS-VACCINE-TRACKER.HTML](https://www.nytimes.com/interactive/2020/science/coronavirus-vaccine-tracker.html)

Vaccine Trials

PRECLINICAL TESTING : Scientists test a new vaccine on cells and then give it to **animals** such as mice or monkeys to see if it produces an immune response. We have confirmed 88 preclinical vaccines in active development.

PHASE 1 SAFETY TRIALS : Scientists give the vaccine to a **small number of people** to test safety and dosage as well as to confirm that it stimulates the immune system.

PHASE 2 EXPANDED TRIALS : Scientists give the vaccine to **hundreds of people** split into groups, such as children and the elderly, to see if the vaccine acts differently in them. These trials further test the vaccine's safety and ability to stimulate the immune system.

PHASE 3 EFFICACY TRIALS : Scientists give the vaccine to **thousands of people** and wait to see how many become infected, compared with volunteers who received a placebo. These trials can determine if the vaccine protects against the coronavirus. In June, the F.D.A. advised vaccine makers that they would want to see evidence that vaccines can protect at least 50 percent of those who receive it. In addition, Phase 3 trials are large enough to reveal evidence of relatively rare side effects that might be missed in earlier studies.

EARLY OR LIMITED APPROVAL : [China](#) and [Russia](#) have approved vaccines without waiting for the results of Phase 3 trials. Experts say the rushed process has serious risks.

APPROVAL : Regulators in each country review the trial results and decide whether to approve the vaccine or not. During a pandemic, a vaccine may receive emergency use authorization before getting formal approval. Once a vaccine is licensed, researchers continue to monitor people who receive it to make sure it's safe and effective.

HOW TO READ THE SYRINGE GRAPHIC

There are currently

213

vaccines in development for
COVID-19.

These fall into

9

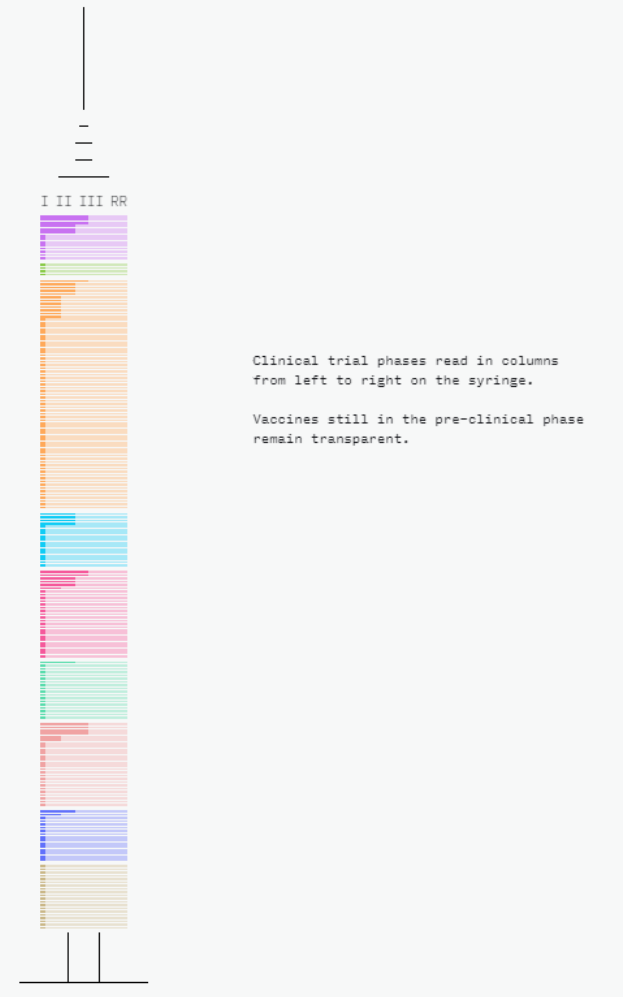
different product
categories/platforms.

At this time,

37

vaccines are in one of four
phases of clinical testing.

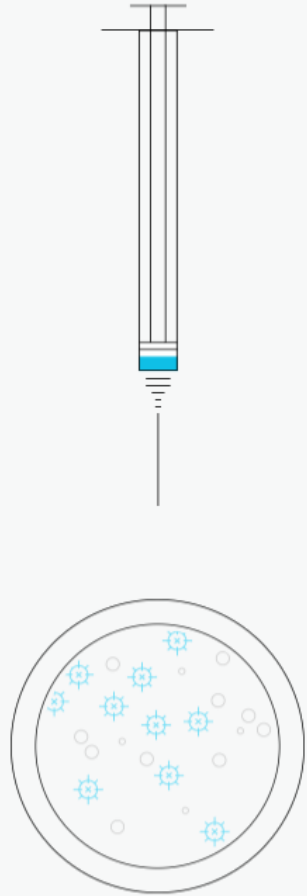
More about the timeline, phases, manufacturing, and approaches to develop a
COVID-19 vaccine.



Clinical trial phases read in columns
from left to right on the syringe.

Vaccines still in the pre-clinical phase
remain transparent.

<https://covid-19tracker.milkeninstitute.org/>



WEAK GERMS INJECTED

Traditionally, vaccines contain the same germs, either killed or weakened, or part of the germ that causes the disease.



ANTIBODIES CREATED

They stimulate your immune system to produce antibodies, as if you were exposed to the germ.



IMMUNITY DEVELOPED

After getting vaccinated, one develops immunity to that disease without having to get it first.

Vaccine landscape

- CDC continues to project early November for first vaccine shipments
- Initially, quantities will be limited
- Each state must provide a plan to CDC for covid vaccine logistics by end of October 2020

- Moderna and BIONTECH vaccines (mRNA) require ultra cold storage (- 80 degrees F)
- Most protein subunit vaccines (Sanofi and Novavax) can be refrigerated for months

- Vaccine clinical trial approved through Navajo Nation IRB. Pfizer/BioNTech vaccine
- 2 doses given 21 days apart; once thawed, must use in 2 days; once reconstituted, must use in 6 hours

Vaccine Testing

Solidarity Vaccines Trial

- Organized by World Health Organization
- Several vaccines would be given at random to one large group of volunteers, while a smaller group would receive a placebo.
- All of the vaccines would be tested against the same placebo group
- All of the volunteers would be living in the same circumstances.
- Trial will start later in October with a small study in Latin America

Vaccine Testing

US government opted for a “harmonized approach” to vaccine trials

US Vaccine makers run their own trials using protocols that followed certain guidelines and let the National Institutes of Health test all of their volunteers in the same way

In exchange for following these rules, the companies would get to tap into to the NIH Network of clinical testing sites, and receive major financial support for their trials..

So far, AstraZeneca, Johnson & Johnson and Moderna have begun trials in the network. Novavax and Sanofi are expected to start their own Phase 3 studies in the next couple of months. But Pfizer, one of the front-runners, never joined the network, opting to run trials completely on its own.

To meet the FDA’s threshold, companies would need to submit two months of followup from half of their trial participants after they receive their last vaccine dose to show there are no major side effects or health problems. Because vaccines are normally given to otherwise healthy people the FDA requires strict evidence of their safety.



Phase III Trials

- New vaccine technology - messenger RNA (mRNA) to produce viral proteins in the body.
- In partnership with **National Institutes of Health**, they found that the vaccine protects monkeys from the coronavirus
- 2 doses
- Side effects noted – “reactogenic”
- Phase III trial launched on July 27
- In October, the company announced that they had finished recruiting all 30,000 participants in the study, including 7,000 people 65 years or older.
- Moderna’s trial protocol indicates they will wait until a significant number of volunteers become sick before seeing how many of them were vaccinated
- If their results meet the FDA’s benchmarks, Moderna could potentially apply for an emergency use authorization by the end of 2020.

Vaccine news



Phase 1–2 Trial of a SARS-CoV-2 Recombinant Spike Protein Nanoparticle Vaccine (Keech, et.al.):

83 participants were assigned to receive the vaccine with adjuvant and 25 without adjuvant, and 23 participants were assigned to receive placebo.

- No serious adverse events were noted.
- Reactogenicity was absent or mild in the majority of participants, more common with adjuvant, and of short duration (mean, ≤ 2 days)
- At 35 days, NVX-CoV2373 appeared to be safe, and it elicited immune responses that exceeded levels in Covid-19 convalescent serum.
- If the trials succeed, Novavax expects to deliver 100 million doses for use in the United States by the first quarter of 2021.

<https://doi.org/10.1056/NEJMoa2026920>

Vaccine news



Adenovirus vaccine

The company has said their total manufacturing capacity for the vaccine, if approved, stands at two billion doses. India's Serum Institute has already [produced millions of doses](#) to be used in trials

On Sept. 6, AstraZeneca [halted global trials](#) of the vaccine to investigate one volunteer, who developed a form of inflammation called transverse myelitis. The British and [Brazilian](#) trials [resumed](#) on Sept. 12.

On October 23, the F.D.A. authorized the [restart](#) of the trial.

Testing Update

15

TYPES OF TEST AVAILABLE

Type of Test	Type of Sample	What Does it Look For?	When Should it Be Used?
Rapid Antigen Test	Nasal swab	Parts of the virus protein	• Symptomatic people within the first 5-7 days of symptoms
PCR Test	Nasal swab, oropharyngeal swab	Parts of the virus nucleic acid	• Initial diagnosis (some rapid tests are available) • May be use for surveillance in people without symptoms
Antibody Test	Blood sample	Antibodies produced by your body	• 10-14 days after symptoms if other tests were not performed. NOT USED to determine immunity



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(+)

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**COVID-19 Ag
CARD**

Mortality Rates

BRIEF REPORTS

Trends in COVID-19 Risk-Adjusted Mortality Rates

J Hosp Med. Published Online First October 23, 2020. DOI: 10.12788/jhm.3552 | 10.12788/jhm.3552

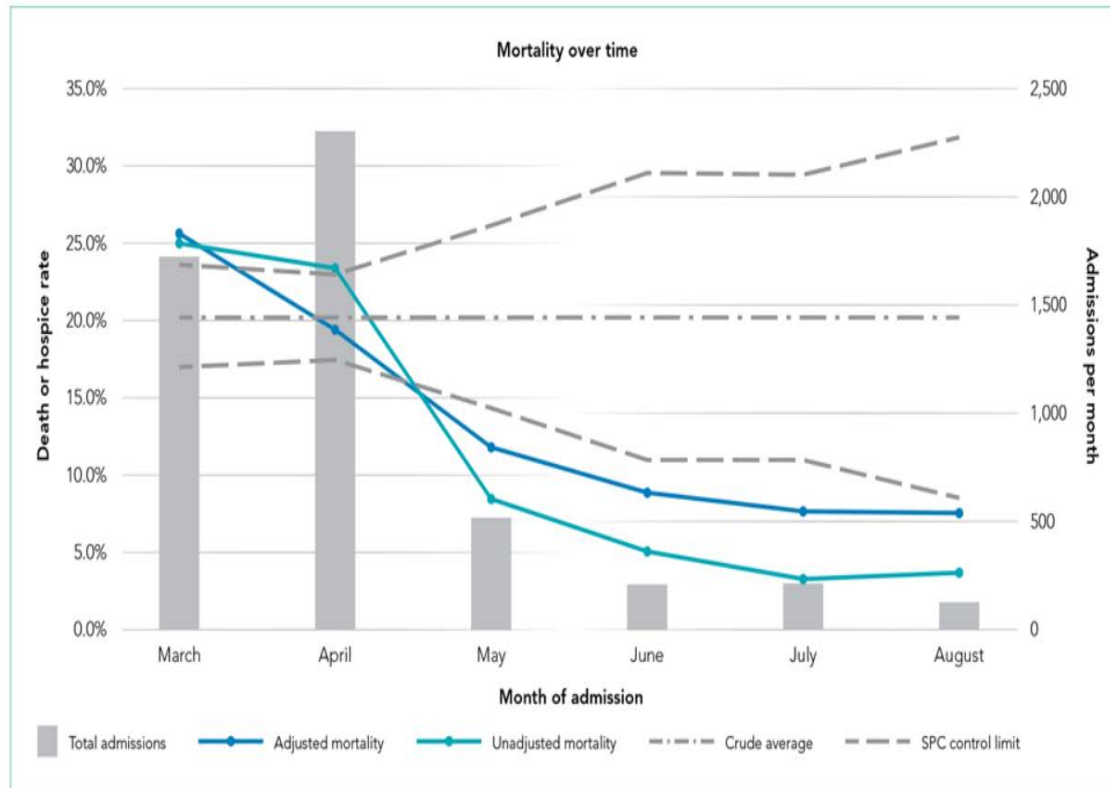


FIG. Adjusted and Unadjusted Mortality or Hospice Rate, by Month of Admission.

- Study looked at 5121 hospitalizations in one health system in NYC
- Found decrease in mortality rates from 25.6% of hospitalized patients in March to 7.6% in August
- Age decreased from 63 in March to 49 in August
- Gender changed from 55% male in March to 34% in August

Mortality Rates

According to CDC, mortality rates were 6.7% in April and 1.9% in September

Potential Reasons include:

- Changing demographics. Median age of confirmed cases were:
 - May – 46
 - August – 38
- Improved community awareness
- Improved clinical experience
 - When to use ventilators
 - Proning
 - Meds (steroids, remdesivir, immune treatments)
- Decreasing hospital volume
- Earlier interventions
- Lower viral load exposure from increased mask wearing and social distancing.



Dr. Chip Thomas

Kayenta, AZ