EXHIBIT 1

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
TEXARKANA DIVISION

MAXELL, LTD., **Plaintiff,** **v.** **APPLE INC.,** **Defendant.**	**CASE NO. 5:19-CV-00036-RWS**

DECLARATION OF BENJAMIN NEUMAN, PH.D. IN SUPPORT OF DEFENDANT APPLE INC.'S MOTION TO STAY PENDING POST-GRANT REVIEW PROCEEDINGS AT THE PATENT OFFICE AND TO CONTINUE TRIAL DUE TO THE COVID-19 PANDEMIC

I. BACKGROUND AND QUALIFICATIONS

1. I am a professor of biology and chief virologist for the Global Health Research Complex at Texas A&M University since January 2021, and a visiting research scientist at Texas A&M-Texarkana, where I was formerly a professor of virology and Chair of Biological Sciences from 2016 to 2021. In this position, I spend most of my time doing research on emerging viruses, virus structure, how viruses behave in the environment, how viruses affect cells, and antiviral discovery and testing. I have taught virology, immunology and synthetic biology at the undergraduate and graduate level. I frequently appear on news TV, radio and print media helping to explain new developments in infectious disease; since 2015 my work in the media has appeared in at least 121 countries, translated into 37 languages.

2. I received my B.S. in Biology from the University of Toledo in 1997, and my Ph.D. in Biological Sciences from the University of Reading in the United Kingdom in 2001. After completing my Ph.D., I was a postdoctoral fellow and then assistant professor at The Scripps Research Institute in La Jolla, California. Following that, I was a lecturer and then an associate professor of virology at the University of Reading. I have remained a visiting professor of virology at the University of Reading since that time.

3. I have studied coronaviruses for 25 years, and published more than 50 articles on the subject. I am also part of the international committee that named SARS-CoV-2, the virus behind the COVID-19 pandemic. I have also authored or co-authored more than 20 peer-reviewed research articles on other topics related to viruses, virus structures, virus behavior in the environment, antivirals, and virus discovery.

II. STATE OF COVID-19 IN THE UNITED STATES, TEXAS, AND TEXARKANA AND THE SURROUNDING AREA

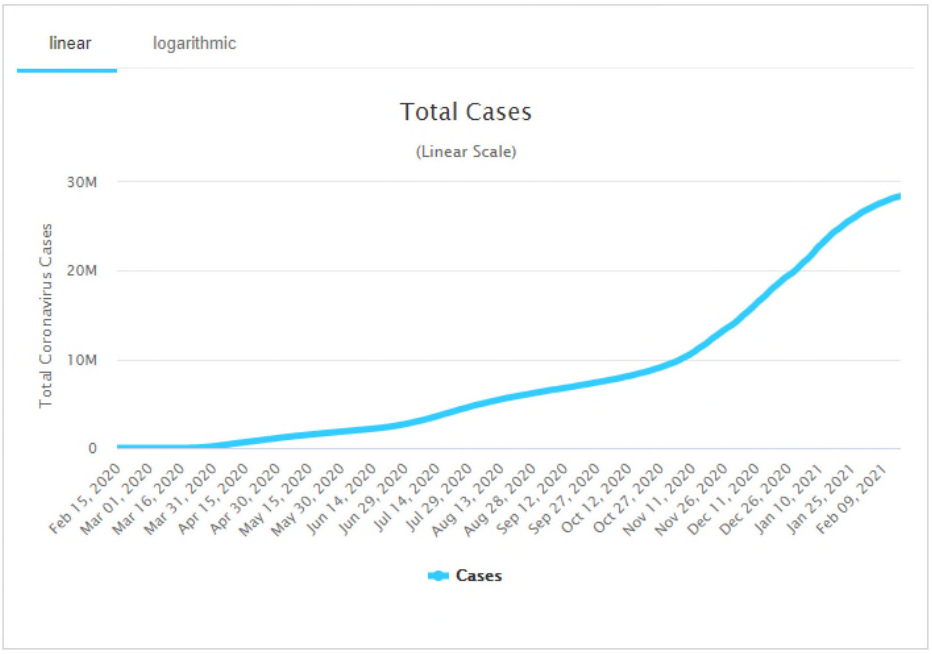
4. As of February 17, 2021, there have been a total of 27,542,421 reported COVID-19 cases in the United States, with more than 56,000 cases in the past week alone. https://covid.cdc.gov/covid-data-tracker/#cases_casesper100klast7days. The total COVID-19 deaths in the United States as of that same date is 485,070, with 1,217 deaths in the past week. https://covid.cdc.gov/covid-data-tracker/#cases_casesper100klast7days.

5. As of February 17, 2021, in Texas there have been a total of 2,579,644 COVID-19 cases and 41,652 deaths. https://www.worldometers.info/coronavirus/usa/texas/. In Bowie County, as of that same date, there have been 6,370 cases and 171 deaths. https://www.worldometers.info/coronavirus/usa/texas/. However, 13.6% of COVID-19 tests in Bowie County are positive, indicating that a majority of cases are going undetected https://covidactnow.org/us/texas-tx/county/bowie_county/?s=1598540. In the other three

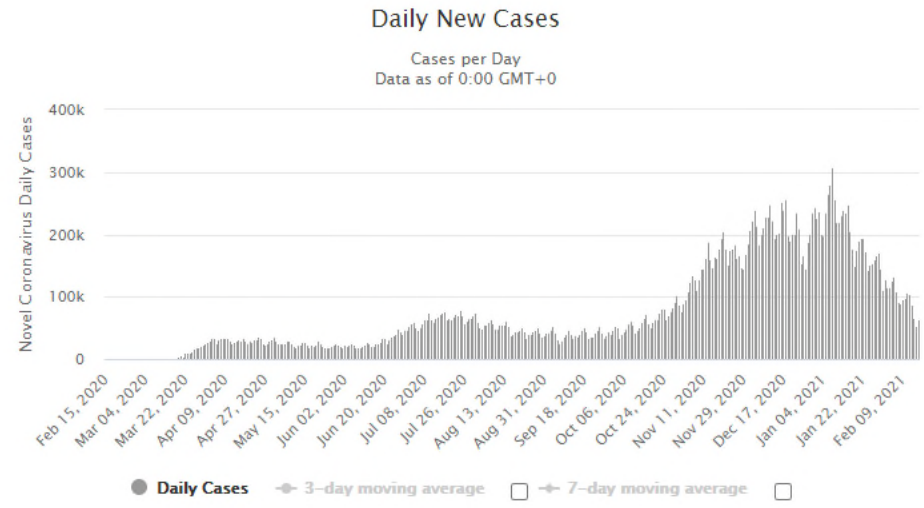
counties from which the Texarkana Division draws jurors—Titus, Red River, Franklin—the total cases as of February 12, 2021 are 4,858 and the total deaths are 129. https://www.worldometers.info/coronavirus/usa/texas/. If the area is expanded to a 75-mile radius around Bowie County, the numbers increase to more than 84,000 cases and nearly 2,000 deaths. Exhibit A, Situational Report for Bowie County.

6. My understanding is that the case of *Maxell, Ltd. v. Apple Inc.* was originally scheduled for trial on December 7, 2020, and that on November 12, 2020, the trial was continued to March 22, 2021. There has been a tremendous surge in cases and deaths in the three months since the trial was continued. COVID-19 cases in the United States, Texas, and the relevant counties in Texas have nearly tripled, and the total COVID-19 deaths have nearly doubled. As of November 12, 2020, the total number of cases in the United States was more than 10.9 million, with over 250,000 deaths. https://www.worldometers.info/coronavirus/country/us/. The following graphs show the changes since November 12, 2020, in total U.S. COVID-19 cases, the daily new COVID-19 cases in the U.S., the total COVID-19 deaths in the U.S., and the daily new deaths in the U.S.:

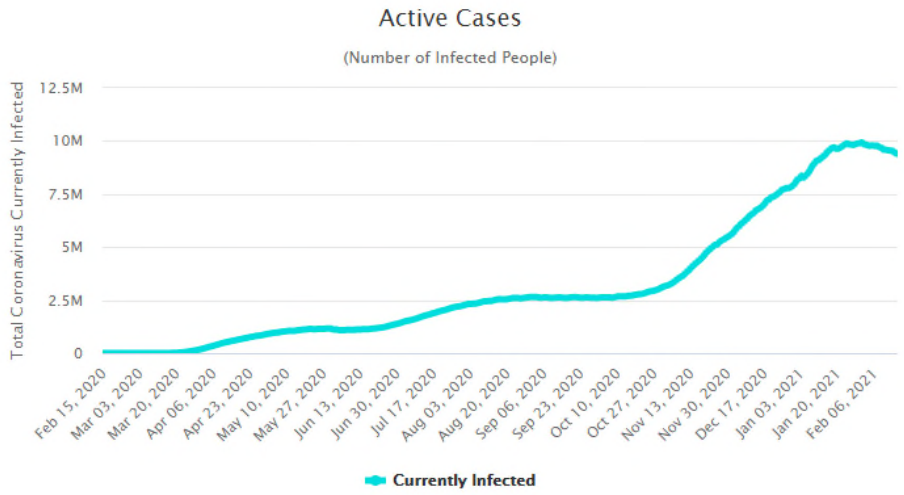
Total Coronavirus Cases in the United States



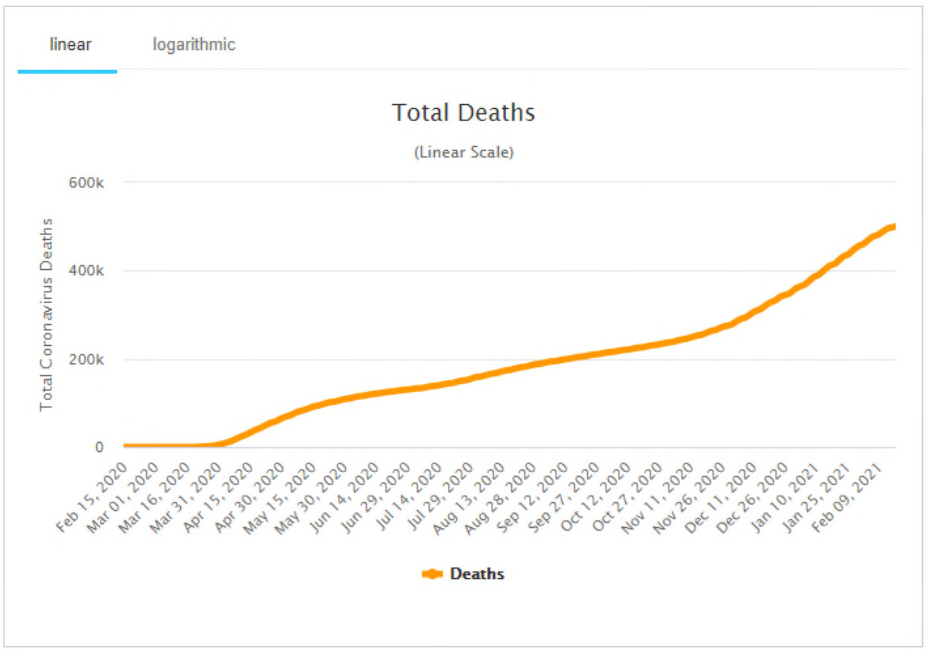
Daily New Cases in the United States

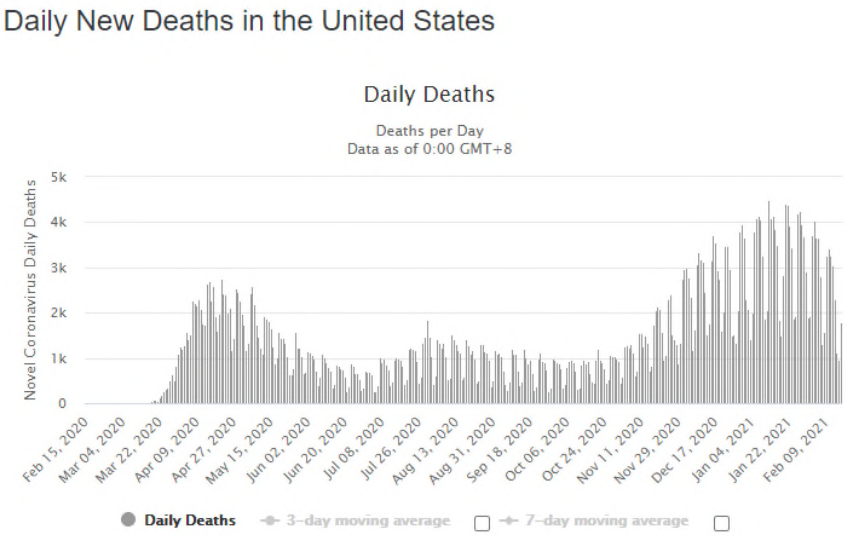


Active Cases in the United States

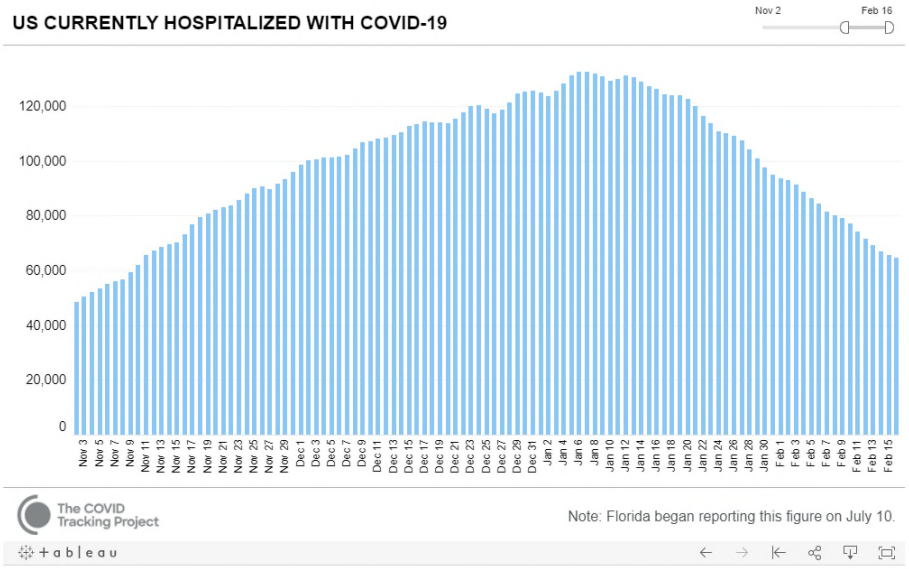


Total Coronavirus Deaths in the United States





https://www.worldometers.info/coronavirus/country/us/. In addition, the COVID-19 hospitalization rate in the U.S. is at roughly the same level that it was in November:



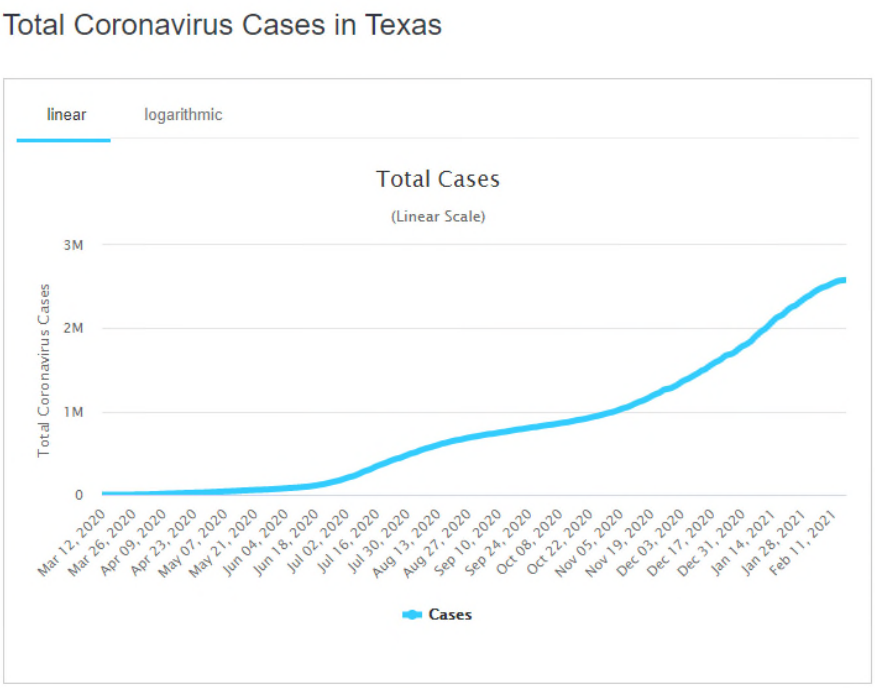
https://covidtracking.com/data/charts/us-currently-hospitalized.

7. The trends in Texas as a whole and East Texas mirror that of the U.S. over that time. In Texas as of November 12, 2020, the total number of cases was approximately 10 million and the number of deaths was more than 21,069.

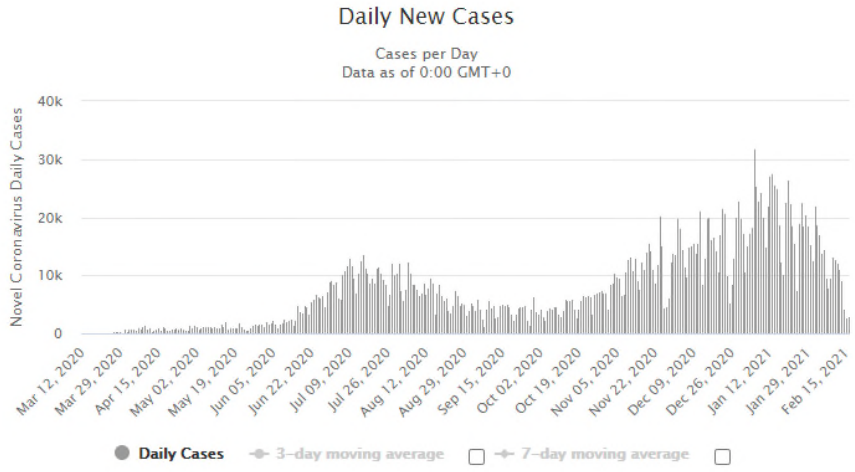
https://dshs.texas.gov/coronavirus/TexasCOVID19DailyCountyCaseCountData.xlsx;

https://dshs.texas.gov/coronavirus/TexasCOVID19DailyCountyFatalityCountData.xlsx.

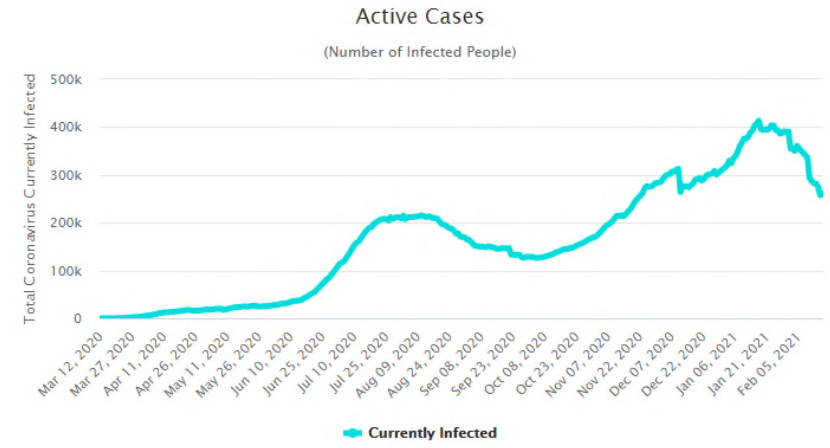
The following graphs show the changes since November 12, 2020, in total Texas COVID-19 cases, the daily new COVID-19 cases in Texas, the total COVID-19 deaths in Texas, and the daily new deaths in Texas:



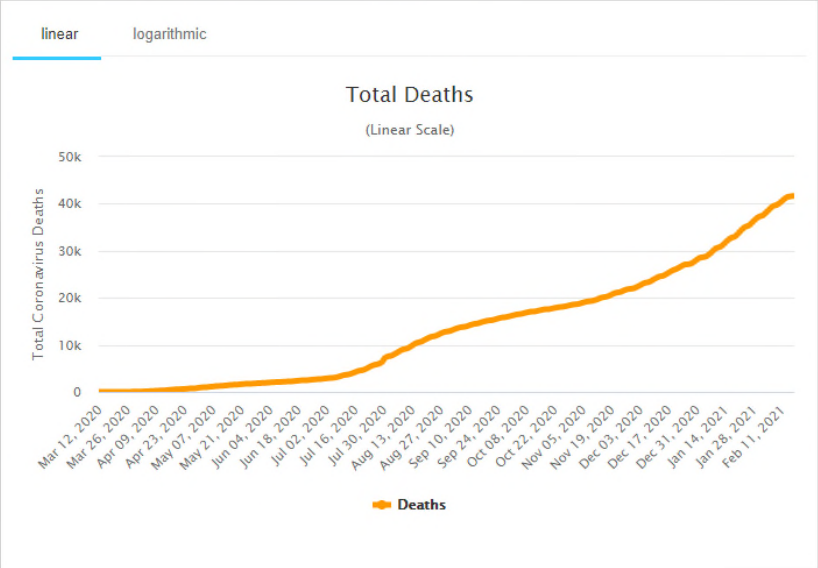
Daily New Cases in Texas



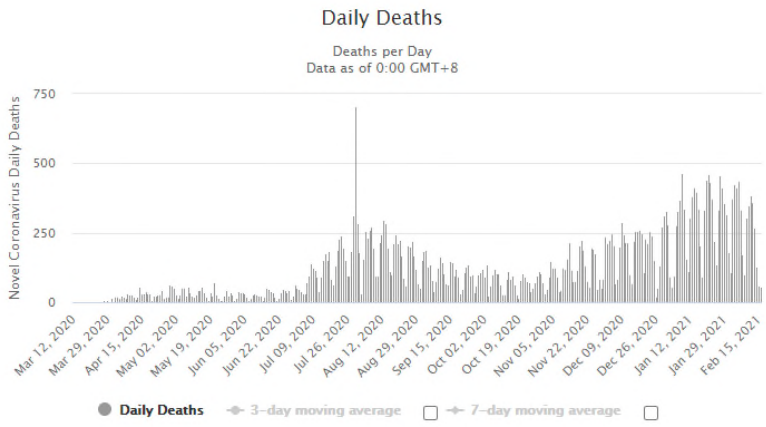
Active Cases in Texas



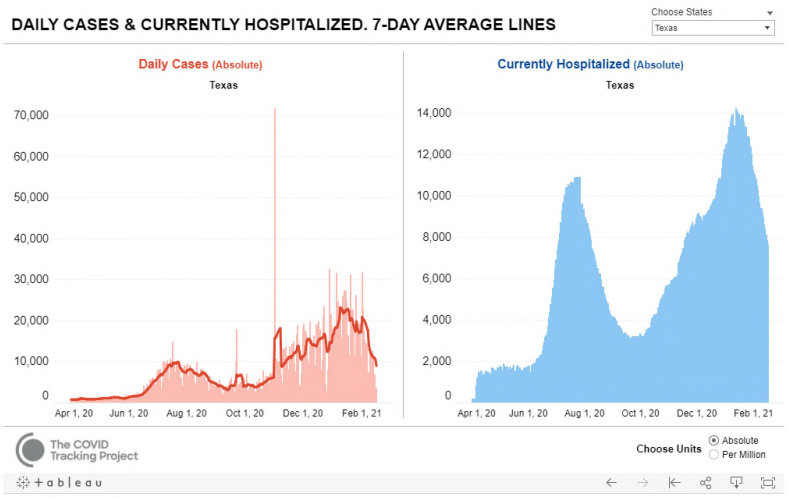
Total Coronavirus Deaths in Texas



Daily New Deaths in Texas



https://www.worldometers.info/coronavirus/usa/texas/. In addition, the COVID-19 hospitalization rate in the Texas is at roughly the same level that it was in November when the trial was continued:



https://covidtracking.com/data/charts/daily-cases-and-currently-hospitalized.

8. In Bowie County as of November 12, 2020, the total number of cases was 2,294 and the total number of deaths was 98. https://dshs.texas.gov/coronavirus/TexasCOVID19DailyCountyCaseCountData.xlsx; https://dshs.texas.gov/coronavirus/TexasCOVID19DailyCountyFatalityCountData.xlsx. And in Titus, Red River, and Franklin Counties, the total cases as of November 12, 2020 was 2,111 and the total number of deaths was 67. https://dshs.texas.gov/coronavirus/TexasCOVID19DailyCountyCaseCountData.xlsx; https://dshs.texas.gov/coronavirus/TexasCOVID19DailyCountyFatalityCountData.xlsx.

9. In recent weeks, Texas has seen COVID-19 hospitalizations and cases trend downward after a holiday season marked by a record-breaking surge. New cases and hospitalizations remain high, however.

10. New COVID-19 variants have recently been discovered in the U.S., which could affect the number of cases and infection rate in the coming weeks and months. One such variant, known as B.1.1.7, was first identified in Britain. https://www.cdc.gov/coronavirus/2019-ncov/more/science-and-research/scientific-brief-

emerging-variants.html. The CDC has warned that this is a more contagious variant of the coronavirus, and could become the dominant source of infections in the United States by March 2021, potentially leading to another surge in cases around the country. https://www.nytimes.com/2021/01/15/health/covid-cdc-variant.html. In making that warning, the CDC stressed that it is "deeply concerned that this strain is more transmissible and can accelerate outbreaks in the U.S. in the coming weeks." *Id.*

11. Another such variant, known as B.1.351 and discovered in South Africa, was recently identified in two people in the Bay Area of California. https://www.latimes.com/california/story/2021-02-11/south-african-covid-variant-california-what-to-know; https://www.cdc.gov/coronavirus/2019-ncov/more/science-and-research/scientific-brief-emerging-variants.html.

12. I understand that many of Apple's counsel, witnesses, and client representatives in this case live and work in the Bay Area. Also, the limited amount of genome sequencing in most parts of the United States suggests that each of these variants may be more widespread than we are aware at the current time.

13. Texas began administering the Moderna and Pfizer COVID-19 vaccines in December 2020. As of a few weeks ago, Texas had administered more doses than any other state, according to the CDC. Texas was the first state to administer 1 million COVID-19 vaccines. https://lrl.texas.gov/scanned/govdocs/Greg%20Abbott/2021/press01142021_vaccine.pdf. Texas has administered nearly half of the more than two million doses it has received so far, putting it in the top 20 states for percentage of doses administered. https://covid.cdc.gov/covid-data-tracker/#vaccinations;

https://www.texastribune.org/2021/01/14/texas-coronavirus-vaccine-one-million/. And Texas is expected to receive an additional 407,650 first doses of the Moderna and Pfizer COVID-19 vaccine from the federal government this week. https://www.kxan.com/news/coronavirus/texas-to-get-more-than-400000-first-doses-of-covid-19-vaccine-for-week-of-feb-15/.

14. In Bowie County, 5.4% of the vaccine-eligible population has received one or more doses of the Moderna or Pfizer COVID-19 vaccine so far, and 2.7% are fully vaccinated. Exhibit A, Situational Report for Bowie County. Numbers in surrounding counties are similar. *Id.*

15. It was recently announced that CHRISTUS St. Michael Health System was named as a COVID-19 Vaccination Hub by the State of Texas to serve the Texarkana region, which will accelerate the vaccination numbers in Bowie County and the surrounding areas. https://www.christushealth.org/st-michael/about-us/news/2021/regional-covid-19-vaccination-hub.

16. Vaccination rates will also increase in these areas, as well as around the country, as the Moderna and Pfizer vaccine supply continues to increase. Just last week, it was announced that the United States had secured an additional 200 million doses of the Moderna and Pfizer vaccines. https://www.wsj.com/articles/biden-says-u-s-struck-deals-for-200-million-more-covid-19-vaccine-doses-11613080885. It is expected that by Fall 2021, most people in the United States who want the Moderna or Pfizer COVID-19 vaccine will be able to get it. https://news.harvard.edu/gazette/story/2020/12/anthony-fauci-offers-a-timeline-for-ending-covid-19-pandemic/. It is also likely that one or more of the investigational vaccines to report positive interim results from ongoing Phase 3 clinical

trials, namely Johnson & Johnson, Novavax, Sanofi and AstraZeneca is likely to be approved in the coming weeks, further increasing the available vaccine supply in the United States.

III. THE RISKS OF A MARCH 22, 2021 JURY TRIAL IN TEXARKANA

17. I understand that trial in this case is now scheduled to begin on March 22, 2021 in the federal courthouse in Texarkana, Texas. I understand the trial will be conducted over nine days before a jury of eight jurors. The trial day will last from approximately 9 am to 5 pm, and will include breaks. I understand that the courthouse likely does not have a modern ventilation system equipped to deal with infectious diseases such as COVID-19. I further understand that at least 15 witnesses will testify in the courtroom during the nine days of trial, and that most or all of these witnesses will travel from some other part of the country or the world to testify.

18. I further understand that, similar to a trial in late 2020 in the *VirnetX Inc. v. Apple Inc.* matter, the jurors will likely be selected on March 22, 2021 from a group of as many as 50 potential jurors. Those jurors will be summoned to the courthouse for jury service. Those potential jurors will be drawn from four counties—Bowie, Red River, Titus, and Franklin. I further understand that Maxell and Apple will have approximately eight attorneys, paralegals, or other representatives in the courtroom each day during the trial. Many, but likely not all, of those attorneys and other representatives will be the same from day to day. I am informed that others in the courtroom will include (a) the presiding judge, (b) the presiding judge's courtroom deputy, (c) two court reporters who will rotate; and (d) from time to time, a federal marshal.

19. Therefore, at any given time, there will be around 30 people in the courtroom during trial. All people in the courtroom will wear masks, with the exception of

the witness and the attorney who is asking questions of the witness. Furthermore, I understand that each party will be supported by a team who will likely number more than 15 attorneys, paralegals, and client representatives per side. Those in the courtroom will return after court each day to work with others on the trial team to prepare for the next day of trial.

20. I understand that the attorneys, paralegals, witnesses, and client representatives will travel to Texarkana, Texas from a variety of locations throughout the United States, including at least San Francisco and Silicon Valley, California; San Diego, California; Los Angeles, California; Chicago, Illinois; Washington, D.C.; Austin, Texas; and Houston, Texas; as well as Japan.

11. I have been asked whether, in my expert opinion as a virologist, this trial would pose any meaningful risk to the participants, the local community, or public safety in general given the current situation with the COVID-19 pandemic, and, if so, to explain why.

12. COVID-19 is a very dangerous illness, and we are still learning about the long term damage it causes. The mechanism of disease appears to be a cytokine storm – an abnormal and self-amplifying malfunction of the immune system that causes damage throughout the body – similar to the mechanism Ebola fever or H5N1 Avian influenza, but quite different from the typical mild and localized disease progression in a common cold or seasonal influenza. Nationally, the rate of death from COVID-19 is approximately 1.7%, and more than 473,000 deaths in the United States have been attributed to COVID-19 since March 2020. https://coronavirus.jhu.edu/data/mortality; https://covid.cdc.gov/covid-data-tracker/#cases_casesper100klast7days. The rate of death increases steadily with age and other risk factors such as underlying medical

conditions. Even for those who do not die from COVID-19, many become severely ill and hospitalization is often required. Currently in Texas, just under 10,000 people are hospitalized with COVID-19. https://www.khou.com/article/news/local/texas/texas-covid-hospitalizations-record-houston-harris-county/285-2549ca26-ebf6-40e0-b29e-e4c945e08a50. Studies have also shown evidence of long-term damage to the heart, even in college athletes, and in cases that were reported to be asymptomatic. https://jamanetwork.com/journals/jamacardiology/fullarticle/2768916; https://www.jacc.org/doi/10.1016/j.jcmg.2020.10.023.

13. In my opinion as a virologist who has studied coronaviruses for 25 years, and who has spent considerable amount of time studying SARS-CoV-2 over the past year, COVID-19 is a multi-layered threat to health and life that would pose an extraordinary risk to those people who would be involved in a trial in Texarkana starting March 22, 2021, as well as to the surrounding community and the communities to which the participants would return.

14. Treating COVID-19 patients is extremely challenging. While many recover enough from COVID-19 infection to return home from the hospital, the extent of recovery varies and serious long-term, even permanent, effects are now starting to be known. It appears that many people continue to suffer from heart, lung, kidney, brain, and other organ ailments after they are no longer positive for the SARS-CoV-2 virus, and some patients may remain impaired for the rest of their lives. https://www.mayoclinic.org/diseases-conditions/coronavirus/in-depth/coronavirus-long-term-effects/art-20490351.

13. One of the reasons that COVID-19 can spread so fast is that it is carried and efficiently transmitted to others by people who are asymptomatic; that is, people who show no signs of the illness and feel perfectly fine. Infected people are most infectious in the two days before the first symptoms appear and for the first several days after the first symptoms appear, when the symptoms are still mild and may be mistaken for some other mild illness or even disregarded entirely. Even more dangerous is the fact that more than half of people who are infected never show any signs or symptoms of infection and yet may spread it to others without knowing it. https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2774707?utm_source=For_The_Media&utm_medium=referral&utm_campaign=ftm_links&utm_term=010721. In fact, many experts, myself included, believe that most infections are transmitted by people who at the time do not know they are infected. These infection transmitters will pass temperature screens and will honestly answer in the negative to a symptom screen. Absent a test, there is no way to identify COVID-19 carriers who are asymptomatic, and we know that even our best tests have significant rates of false-negative results, varying by the particular test, in which they fail to detect an infection that is present and possibly capable of being transmitted.

16. COVID-19 is extremely contagious. There is a consensus among medical professionals that bringing together people in groups significantly increases the risk of COVID-19 transmission, and the larger the group, the greater the risk of transmission. It has also been reported, based on incidence rates in Europe, that the new variants including B.1.1.7 and B.1.351 are considerably more infectious compared to older circulating variants of SARS-CoV-2. https://www.bbc.com/news/health-55507012.

17. The CDC has published guidelines on group gatherings: https://www.cdc.gov/coronavirus/2019-ncov/community/large-events/considerations-for-events-gatherings.html. One of the "guiding principles" that the CDC provides is the following: "The *more people* an individual interacts with at a gathering and the longer that interaction lasts, the higher the potential risk of becoming infected with COVID-19 and COVID-19 spreading." Consistent with those guidelines, on January 20, 2021, President Biden issued an Executive Order mandating social distancing and mask wearing for all persons in Federal building. https://www.whitehouse.gov/briefing-room/presidential-actions/2021/01/20/executive-order-protecting-the-federal-workforce-and-requiring-mask-wearing/.

18. Even mask wearing is not enough to protect from infection when multiple people are in a confined space, as in a case in Vermont where a correctional worker who was wearing a mask contracted the virus after multiple short exposures to infected inmates. https://www.cdc.gov/mmwr/volumes/69/wr/mm6943e1.htm.

19. In my opinion, a nine-day indoor trial in Texarkana would fall into the category the CDC describes as the "highest risk": "Large in-person gatherings where it is difficult for individuals to remain spaced at least 6 feet apart and attendees travel from outside the local area."

20. It is my opinion that in a group of the size expected at trial, given the present state of the COVID-19 pandemic in Bowie County and the other surrounding counties in which the potential jurors reside, there is a high likelihood that several would be carrying the SARS-CoV-2 virus that causes COVID-19, and they would be capable of transmitting it to others, most likely while they are asymptomatic. In Bowie County, 1 out of 15 residents have tested positive for COVID-19. *See* Exhibit A, Situational Report for Bowie County. When looking at the area

within a 75-mile radius of Bowie County (I would expect that many of the potential jurors either live within this expanded area or interact with others who live within that area), that number increases to 1 out of 12. *Id.* Moreover, these numbers do not account for untested cases (including of asymptomatic but infected individuals who have not sought testing), and it is well known that COVID-19 can by spread by persons without any symptoms. According to the "COVID-19 Event Risk Assessment Planning Tool" published by researchers at Georgia Tech, there is a 71% likelihood of at least one person having COVID-19 from a group of around 100 people gathered in Bowie County. Chande, A.T., et al., *Interactive COVID-19 Event Risk Assessment Planning Tool,* https://covidl9risk.biosci.gatech.edu (last visited on February 17, 2021). The numbers for Franklin, Red River, and Titus counties are similar. *Id.*

18. I further understand that even after the jury is selected, the trial would continue to require a significant group of people to remain together in an enclosed indoor space, with witnesses and most of the attorneys and client representatives having come from outside the local area. Furthermore, a courtroom in a courthouse without modern ventilation is an environment that would present a higher risk of COVID-19 transmission. Not only would it be challenging to maintain social distance, but a trial, by its very nature, involves a large amount of speaking. That would include jurors speaking during deliberations, which I understand often take place in an enclosed space that is smaller than a courtroom and in which social distancing may not be possible. Speaking is one of the main ways that COVID-19 is transmitted from person to person, because COVID-19 spreads by aerosols. In other words, COVID-19 can be transmitted in the air after a person speaks or breathes https://www.nature.com/articles/s41591-020-0843-2. There is now strong evidence that COVID-19 remains in the air, in imperceptible aerosol form, after a person speaks.

https://www.pnas.org/content/117/22/11875. The length of time that such particles remain in the air varies, but is longer in an enclosed indoor space with less ventilation than outdoors. Moreover, I understand that litigation teams in cases like this also need to work together in workspaces outside of court, and those interactions could also lead to disease transmission.

19. I believe the risk of transmission is made worse because most of the attorneys, client representatives, and witnesses who will be participating in the trial will travel from outside the local area. I understand that many of the participants reside in large cities, such as Los Angeles and San Francisco, that have high COVID-19 infection rates. And they will mostly be traveling through some of the busiest airports in the country to reach Texarkana, including Dallas-Fort Worth. The CDC has continued to caution against air travel, warning that "social distancing is difficult on crowded flights, and sitting within 6 feet of others, sometimes for hours, may increase your risk of getting COVID-19." https://www.cdc.gov/coronavirus/2019-ncov/travelers/travel-during-covid19.html#:~:text=Travel%20increases%20your%20chance%20of%20spreading%20and%20getting%20COVID%2D19,and%20others%20from%20COVID%2D19.

20. In my expert opinion, even though certain precautions may be taken to lower the chance of spreading the virus, you cannot eliminate the risk of an asymptomatic outsider unknowingly bringing COVID-19 to Texarkana, such as by contracting it en route. Because COVID-19 can be transmitted asymptomatically, temperature and symptom screenings are not effective, and if even one person has it, then everyone is at risk of infection, including everyone in the courtroom, the courthouse, and the parties' hotels and conference rooms. Rapid tests like the Binaxnow rapid COVID antigen test are available, but are considerably

less sensitive than the standard nose or cheek swab PCR test, giving false negative results for 35.8% of symptomatic patients and 64.2% of asymptomatic patients. https://www.cdc.gov/mmwr/volumes/70/wr/mm7003e3.htm. SARS-CoV-2 makes about 10,000 non-infectious "dud" virus particles per infectious virus particle https://www.nature.com/articles/s41586-020-2895-3. The lower limit of detection for the Binaxnow rapid antigen test is equivalent to 140.6 infectious particles, roughly equivalent to 1.4 million total virus particles. https://www.fda.gov/media/141570/download. Nose or cheek swab PCR tests are able to detect a lower limit of 100 total virus particles. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7302192/. Therefore, the best available rapid antigen test is around 14,000 times less sensitive than a standard PCR test. Unfortunately, PCR tests currently have to be shipped out of Texarkana for processing, and have around a three-day wait for results under the best conditions. The combination of delay and decreased sensitivity of rapid COVID-19 tests creates a risk of spreading the disease throughout the Texarkana community, in addition to potentially inadvertently adding strains from other parts of the country to the locally circulating virus population. Any increases in the infection rate in the Texarkana area could further strain local hospitals and harm the local economy, and stretch the resources of East Texas and surrounding metropolitan areas.

21. In November 2020, even with precautions taken such as masks and social distancing, 13 trial participants at a trial in the federal courthouse in Sherman, Texas tested positive for COVID-19 during trial. https://www.heralddemocrat.com/story/news/2020/11/18/judge-halts-fed-jury-trials-sherman-amid-covid-19-concerns/3765209001/.

22. A recent conference of entrepreneurs, executives and investors attempted to create an "immunity bubble" at a conference by repeatedly testing the 80 attendees who had traveled from various parts of the country to take part. The conference host and 23 other guests caught COVID-19 during the event despite collecting over 450 negative COVID-19 tests from attendees. https://www.nytimes.com/2021/02/16/us/peter-diamandis-covid-ca.html.

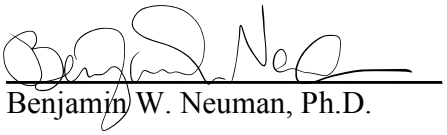
23. Based on the information presented above, in my expert opinion, proceeding with a trial in Texarkana on March 22, 2021 is very likely to cause transmission of the SARS-CoV-2 virus to the participants, the local community, and the communities to which the trial participants return after the trial is over.

24. While East Texas and the United States as a whole are still recovering from the worst surge of coronavirus cases documented anywhere in the world, there is cause for optimism about the return of safe indoor gatherings, if progress in increased testing and reduced coronavirus transmission can be maintained. Positive cases across Texas and America are decreasing at the moment. Test positivity rates in Bowie county are also down by about a third from the early January holiday surge, suggesting the number of undocumented infections is decreasing.

25. From a virological perspective, I strongly urge that the trial be postponed to a date when vaccines are available to all of the trial participants who want to receive it and the current high infection risk has largely subsided. The risks posed by proceeding with a trial now are substantial.

I declare under the laws of the United States of America that the foregoing is true and correct.

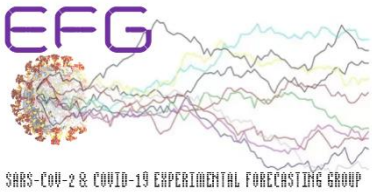
Executed on February 17, 2021 at College Station, Texas.



Benjamin W. Neuman, Ph.D.

EXHIBIT A

Situational Report for Bowie County (and the 75 mile area surrounding)



General situations:

	75 mi radius	50 mi radius	25 mi radius	Bowie County
Total Cases[1,3]	84451	20360	10926	6206
Total Deaths[1,3]	1974	431	238	164
Attack Rate[2]	75%	72%	78%	88%
CFR[1, 2]	2.62%	2.26%	2.41%	2.64%
Incidence[1,3]	8.61%	7.89%	7.34%	6.54%
Cases per capita[3]	1 out of 12	1 out of 13	1 out of 14	1 out of 15
Test Positivity[3,4,5,6]	15.32%	13.86%	15.98%	16.03%
Mobility[7,8,9]	81%	80%	78%	83%
Mask Compliance[10,11,12]	65%	45%	48%	50%
Staffed Hospital Beds (Avail %)	12%	11%	11%	12%
Staffed ICU Beds (Avail.%)	90%	86%	82%	84%

ALL DATA VALID AS OF 5 FEB 2021

SPECIFIC ITEMS OF INTEREST

Counties drawing upon Texarkana for hospital care of COVID-19 patients

Until January 4, 2021, up to 22 separate counties in Texas other than Bowie were represented in Covid-19 patient counts for the two largest hospitals – Wadley Regional Medical Center and Christus St. Michael Health system – in Bowie County[13,14,15]. Additionally, the service agreements between Wadley, and Christus, with surrounding areas meant that up to 8 Arkansas counties other than Miller, three Oklahoma counties, and five Louisiana parishes had patients sent to those hospitals as well[14,15, 17].

Since January 4th, 2021, those two hospitals report the majority of patients are from required service areas only – Bowie, Cass, and Red River counties in Texas[13].

Mask Compliance: percentage of population wearing masks habitually in public areas

As shown above, general compliance with mask mandates/requests is below state norms across the board. These numbers are up slightly, overall, from pre-Christmas levels, for an aggregate increase of 7.5% over the last 30 days. This trend has slowed since K-12 returned after the MLK holiday. The current rate on increasing compliance is .09% per week since that time[10,11].

Vaccine Rollout: percentage of eligible populations with one or more doses.

Reliable vaccination data is not available for all four states in the region. For Bowie County, Texas, 5.4% of the vaccine eligible population has received one or more doses, and 2.7% are fully vaccinated.

The numbers for the immediate counties nearby in Texas are similar:

Cass County:	**2.75% have one dose,**	**1.2% are fully vaccinated**
Morris County:	**5% have one dose,**	**2.6% are fully vaccinated**
Red River County:	**12.1% have one dose,**	**1.6% are fully vaccinated**
Titus County:	**5.5% have one dose,**	**2.4% are fully vaccinated**

([3])

Vaccine Acceptance across the region hovers at 60.1%[10].

Projections: time to full vaccination of eligible populations.

Based upon vaccine delivery, reported vaccinations, survey data, and State plans, the following can be calculated[2,3,10,12,13]:

Estimated date for 50% fully vaccinated	**September-October 2021**
Estimated date for 60% fully vaccinated	**November-December 2021**
Estimated date for 70% fully vaccinated	**February-March 2022**
Estimated date for 80% fully vaccinated	**April-May 2022**
Estimated date for 90% fully vaccinated	**---**

No date for "full" vaccination can be computed with any reliability. Given the self-reported resistance to vaccination and the number of requests for exemptions, it is doubtful a date could be calculated or projected with any reliability[2,10,12].

Hospital COVID-19 Occupancy Trend

From the data above, current occupancy for general Covid-19 patients hovers in the high 80's. this number is trending incrementally downward at the rate of .085% per week since February 1, 2021.

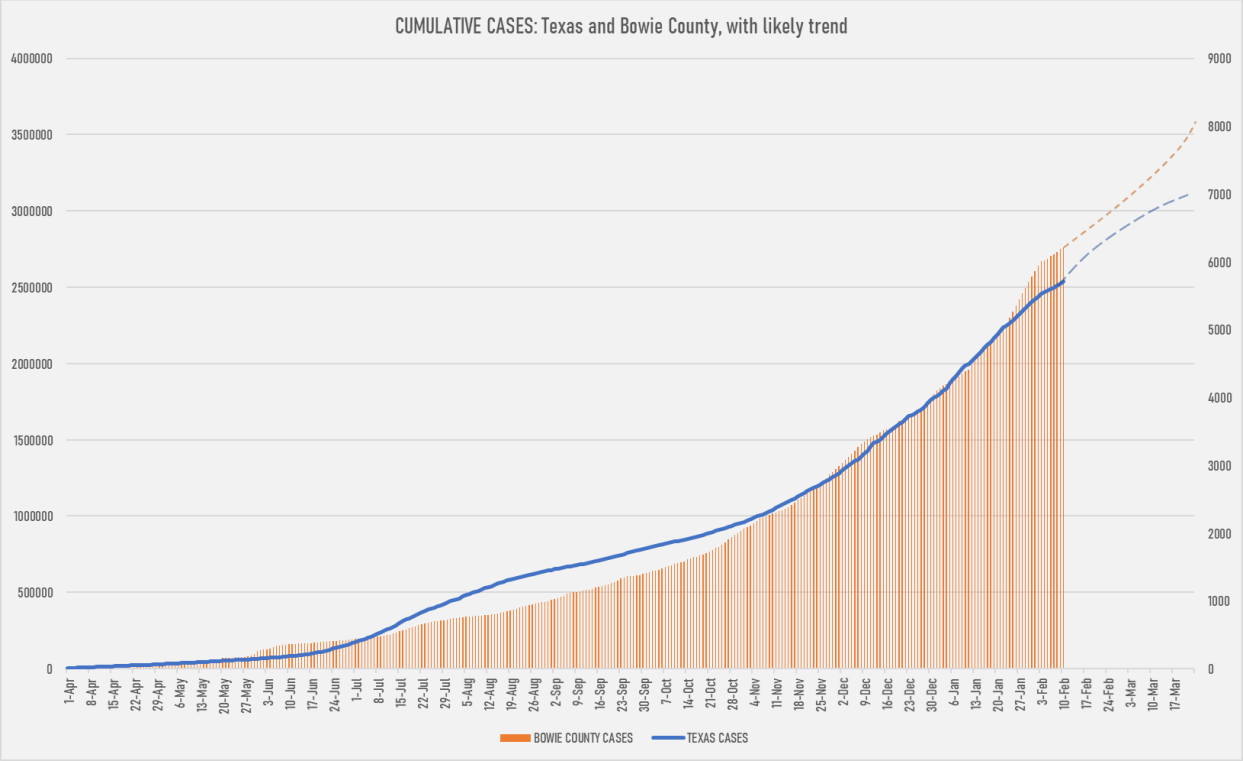
From the data above, current occupancy for ICU Covid-19 patients hovers in the 16-18 percent range. The current trend is downward at the rate of .785% per week since January 25, 2021.

Bowie County: Current COVID-19 Trend

The outlook for Bowie County is a continued rise in cases and deaths. The attack rates in the ArkLaTex are among the highest in the south-central U.S., stubbornly above 70%. The effective *R* is above 1.1, sometimes swinging as high as 1.5. This indicates that short term (12 days) and longer term (45 days) projections will see continued exponential case increases[2].

	75 mi radius	Bowie County
12 day projection	+ 450-1000 cases + 150-225 deaths	+ 150-300 cases + 15-20 deaths
45 day projection	+ 1100-3000 cases	+ 425-600 cases

The six-month outlook conservatively suggests more than a doubling of cases, for 170,000 in the 75 mile radius, and 13,000 for Bowie County[12].



SOURCES

1	Johns Hopkins University CSSE	9	Apple MTR
2	Texas Emergency Management Advisory Group - Public Health Modeling Team	10	Carnegie Mellon University - Delphi Group
		11	Cleveland Federal Reserve Bank
3	Texas Department of State Health Services	12	IHME
4	Arkansas Department of Health	13	Texas Division of Emergency Management
5	Louisiana Department of Health	14	Texas DSHS Trauma Service Area "F"
6	Oklahoma State Department of Health	15	NETRAC
7	Descartes Labs	16	Miller County OEM
8	Unacast	17	City of Texarkana (Texas) OEM

PROVISO

DCM software:	bmss and fEIR packages in the R statistical software (vers. 4.0.2).
Forecasting software:	fpp2 and fpp 3 (R).
Time/trend analyses software:	RATS (vers. 10.0)
Simulations:	MCMCpack (MCMC, BOOT, JK, EASTON), DtD, JAGS, BUGS (R).
Web Scraping and Harvesting:	*general:* rvest, xml2, httr - *particular*: Rfacebook, instaRapi, twitter, PRAW
Automated data gathering:	chronR, Rselenium

All sims, automated data gathering, fpp2, and fEIR performed on bonded Lenovo V470 Intel i7 4771.
All others performed on Lenovo X1 Intel i7 10710U.

The authors and investigators have no C/COI to claim or state. No HSR required.

All questions/concerns should be directed to PI/LR/Author

Casey, Walter

NO EMBARGO.