No. 20A94

IN THE SUPREME COURT OF THE UNITED STATES

HARVEST ROCK CHURCH, INC.; HARVEST INTERNATIONAL MINISTRY, INC., ITSELF AND ON BEHALF OF ITS MEMBER CHURCHES IN CALIFORNIA,
Applicants,

v.

GAVIN NEWSOM, IN HIS OFFICIAL CAPACITY AS GOVERNOR OF THE STATE OF CALIFORNIA,
Respondent.

On Emergency Application for Writ of Injunction to the Honorable Elena Kagan, Associate Justice of the United States Supreme Court and Circuit Justice for the Ninth Circuit

MOTION BY EPIDEMIOLOGISTS AND PUBLIC HEALTH EXPERTS, WITH ATTACHED PROPOSED *AMICUS CURIAE* BRIEF IN SUPPORT OF RESPONDENT AND IN OPPOSITION TO EMERGENCY APPLICATION FOR WRIT OF INJUNCTION FOR LEAVE (1) TO FILE THE BRIEF, (2) TO DO SO IN AN UNBOUND FORMAT ON 8½-BY-11-INCH PAPER, AND (3) TO DO SO WITHOUT TEN DAYS' ADVANCE NOTICE TO THE PARTIES

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MOTION FOR LEAVE (1) TO FILE *AMICUS CURIAE* BRIEF OF RELIGIOUS AND CIVIL-RIGHTS ORGANIZATIONS IN SUPPORT OF RESPONDENT AND IN OPPOSITION TO EMERGENCY APPLICATION FOR WRIT OF INJUNCTION, (2) TO DO SO IN AN UNBOUND FORMAT ON 8½-BY-11-INCH PAPER, AND (3) TO DO SO WITHOUT TEN DAYS' ADVANCE NOTICE TO THE PARTIES[1]

Movants, leading epidemiologists and public health experts who have been extensively engaged in efforts to research the SARS-CoV-2 virus and control the spread of COVID-19, the disease it causes, respectfully request leave of the Court to (1) file the attached *amicus curiae* brief in support of respondent and in opposition to applicants' emergency application for a writ of injunction, (2) file the brief in an unbound format on 8½-by-11-inch paper, and (3) file the brief without ten days' advance notice to the parties.

Positions of the Parties

Applicants did not respond to a request for their position on this motion. Respondent consents to this motion.

Identities of *Amici*; Rule 29.6 Statement

The proposed *amici* are doctors, scientists, researchers, and professors who have no parent corporations and are not owned, in whole or in part, by any publicly held corporation. The proposed *amici* are:

- Gregg Gonsalves, PhD
- William Hanage, PhD
- Yvonne Maldonado, MD

[1] No counsel for a party authored this motion or the proposed *amicus* brief in whole or in part, and no person other than *amici* and their counsel made a monetary contribution to fund the motion's or brief's preparation or submission.

- Gavin Yamey, MD MPH MA

Interests of *Amici*; Summary of Proposed Brief

Movants are preeminent epidemiologists, professors, and doctors who study the incidence, spread, and control of infectious diseases. Since the emergence of the novel coronavirus SARS-CoV-2, the virus that causes COVID-19, all of *amici curiae* have been extensively engaged in studying the disease and advising public health officials about how to slow its transmission.

Amici curiae submit this brief to assist the Court in understanding what they and other scientists have learned about the spread and control of SARS-CoV-2 over the last ten months. They are not attorneys and do not directly address the legal issue in the case. But that legal issue—whether California's COVID-19 regulatory regime treats activities that present similar risks differently—depends upon empirical and scientific premises about SARS-CoV-2, the way the virus is transmitted, and how it can be controlled. *Amici curiae* submit this brief to assist the Court in understanding the science relevant to the transmission and control of COVID-19 so that the Court's decision is grounded in medical and scientific reality. Ultimately, they hope this brief will assist the Court in understanding what activities are highest-risk and why.

Movants' proposed brief sets out three significant facts that scientists have learned about to the transmission of COVID-19 over the last ten months. First, most transmission of the disease is person-to-person, through respiratory droplets or aerosolized particles that enter the air from an infected person's mouth or nose. Talking loudly, shouting, and singing all increase the risk of disease spread through

emission of aerosolized particles. Second, the dose matters: The number of viral droplets and particles that enter a person's body (a function of the quantity of those droplets and particles in the air and the amount of time a person spends inhaling that air) determines whether the virus can overcome the body's defenses and infect that person. Third, a large proportion of infected people are asymptomatic, but these people (because they are *infectious* and unaware) play a critical role in spreading the disease.

These factors have significant implications for which activities are most likely to promote the spread of COVID-19 and therefore must be subject to stringent controls. As the proposed brief explains, indoor gatherings where large numbers assemble for extended periods of time and where singing, chanting or loud talking occur — including the indoor religious worship services at issue in this case—fuel the spread of COVID-19 and must be strictly regulated to reduce the number of cases and deaths in California.

Movants respectfully request that the Court grant their motion for leave to file their proposed *amicus* brief.

Format and Timing of Filing

Applicants filed their emergency application on November 23, 2020. In light of the November 28, 2020 deadline that the proposed *amici* understand has been set for responding to the application, there was insufficient time for the proposed *amici* to prepare their brief for printing and filing in booklet form, as ordinarily required by Supreme Court Rule 33.1. Nor, for the same reason, were the proposed *amici* able to

provide the parties with ten days' notice of their intent to file the attached brief, as ordinarily required by Rule 37.2(a). But the proposed *amici* did provide notice of their intent to file the brief to the parties on November 24, 2020, promptly after the case was docketed and the Court requested a response from Respondents.

* * * * *

For the foregoing reasons, the proposed *amici* respectfully request that the Court grant this motion to file the attached proposed *amicus* brief and accept it in the format and at the time submitted.

Respectfully submitted.

/s/ Susannah L. Weaver

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NOVEMBER 2020

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BRIEF OF EPIDEMIOLOGISTS AND PUBLIC HEALTH EXPERTS, AS *AMICI CURIAE* IN SUPPORT OF RESPONDENT AND IN OPPOSITION TO EMERGENCY APPLICATION FOR WRIT OF INJUNCTION

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RULE 29 DISCLOSURE STATEMENT

All *amici curiae* are individuals participating in their personal capacity. None has any parent corporations or is owned, in whole or in part, by any publicly held corporation.

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INTEREST OF *AMICI CURIAE*[1]

Amici curiae are preeminent epidemiologists, professors and doctors who study the incidence, spread, and control of infectious diseases. Since the emergence of the novel coronavirus SARS-CoV-2, the virus that causes COVID-19, all of *amici curiae* have been extensively engaged in studying the disease and advising public health officials about how to slow it transmission. The *amici* are:

- Gregg Gonsalves, PhD, is a professor of the epidemiology of microbial diseases. A MacArthur Fellow, Dr. Gonsalves has published numerous peer-reviewed articles in leading journals related to the transmission and control of infectious diseases. During the last year, he has focused his research on COVID-19.

- William Hanage, PhD, is a professor of epidemiology and evolutionary biology with extensive experience combining molecular epidemiology with population genetics to study the transmission and evolution of pathogens, including viruses like SARS-CoV-2. Recently, his research has focused on the seeding of outbreaks outside Wuhan, China and the impact of social distancing and other non-medical interventions on the transmission of COVID-19.

[1] No counsel for a party authored this brief in whole or in part, and no person other than *amici* or their counsel made a monetary contribution intended to fund the brief's preparation or submission. A motion for leave to file accompanies this brief.

- Yvonne Maldonado, MD, is a physician and professor of pediatrics, epidemiology, and population health. She previously served as an Officer in the Epidemiology Intelligence Service of the Centers for Disease Control and Prevention. She is currently involved in over 10 clinical, epidemiology, and laboratory-based studies related to the COVID-19 pandemic, as well as epidemiologic modeling at the state and national level. She has published over 200 peer-reviewed articles in scientific journals.

- Gavin Yamey, MD MPH MA, is a physician and professor of global health and public policy. He leads a team of researchers who conduct global health policy analysis and engagement with policymakers on a wide range of public health issues, including pandemic preparedness and response. He has written widely on COVID-19, including in his regular column in *TIME* magazine (https://time.com/author/gavin-yamey/).

Amici curiae submit this brief to assist the Court in understanding what we and other scientists have learned about the spread and control of SARS-CoV-2. We are not attorneys and do not directly address the legal questions in the case. But we feel strongly that, where legal issues depend upon empirical and scientific premises about SARS-CoV-2, the way the virus is transmitted, and how it can be controlled, these must be grounded in medical and scientific reality, not intuition. In particular, we are deeply concerned about scientifically incorrect suggestions that activities that might be described in comparable lay terms, *e.g.*, "shopping on a supermarket aisle" and "worshipping on a church aisle," pose comparable public health risks. We hope

this brief will assist the Court in understanding what activities are highest risk and why. Ultimately, we provide our expert judgment that California's effort to control the spread of SARS-CoV-2 treats comparable public health dangers comparably.

This case arises from a pandemic that remains uncontrolled and is indeed dramatically worsening, with a vaccine on the horizon, but still months away. California's COVID-19 crisis is bad and getting worse. Yesterday, 16,659 new cases were reported in California, and over the past week, there has been an average of 13,558 cases per day, *more than double* the average two weeks ago. Since the pandemic began, there have been 1,153,005 cases and 18,875 COVID-19 deaths in California.[2] The State's interest in preventing the spread of COVID-19 could not be more compelling: preventing avoidable disease, loss of life on a massive scale, and health system collapse from hospitals and intensive care units becoming overwhelmed. To protect its residents from this highly contagious and deadly disease, whose spread is fueled by people who do not display symptoms, the State of California has put into place a dynamic and data-driven regime, grounded in the latest science and responsive to facts on the ground. We support California's efforts.

INTRODUCTION AND SUMMARY OF ARGUMENT

The novel coronavirus SARS-CoV-2, which causes COVID-19, first was detected in humans in December 2019 and quickly spread to every corner of the earth. COVID-19 has already caused severe illness and death in people of all ages and

[2] New York Times COVID-19 database, *available at* https://www.nytimes.com/interactive/2020/us/coronavirus-us-cases.html.

almost every nation. And scientists are only beginning to learn about the potential long-term health effects of the virus, including for those infected people who exhibit only mild or no symptoms.[3] COVID-19, the worst pandemic in a century, is the most serious emergency public health threat we have seen in our lifetimes, and infection rates, hospitalizations, and deaths are currently on the rise in almost every State, including California.

There is much to be learned about COVID-19—unsurprisingly, given the relative recency of the first cases of human infection. But the scientific community *has* gained a massive amount of knowledge over the last ten months. Epidemiologists and public health researchers, like *amici curiae*, who study the incidence, distribution, and control of diseases, have identified several important facts bearing on the spread (and therefore control) of SARS-CoV-2.

First, most transmission of the disease is person-to-person, through respiratory droplets or aerosolized particles that enter the air from an infected person's mouth or nose. Talking loudly, shouting, and singing all increase the risk of disease spread through emission of aerosolized particles. Second, the dose matters: The number of viral droplets and particles that enter a person's body (a function of the quantity of those droplets and particles in the air and the amount of time a person spends inhaling that air) determines whether the virus can overcome the body's

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[3] *See* DeeDee Stiepan. Long-term symptoms, complications of COVID-19. *Mayo Clinic* (Aug. 3, 2020), *available at* https://newsnetwork.mayoclinic.org/discussion/long-term-symptoms-complications-of-covid-19/.

defenses. Third, a large proportion of infected people are asymptomatic, but these people (because they are *infectious* and unaware) play a critical role in spreading the disease.

These facts combined lead to a number of conclusions relevant to protecting people. The more people gathering in a space, the more likely someone will be infectious (even without knowing it). Indoor spaces are much more likely to promote transmission than outdoor spaces because respiratory droplets and particles are trapped. The risks of transmission are increased by loud talking, shouting or singing. And the longer a person spends in proximity to someone infected, the more likely that person is to receive a high enough dose to become infected. Ultimately, large indoor gatherings for an extended period fuel the spread.

Indoor services at houses of worship are particularly high risk for the transmission of COVID-19. They typically involve large numbers of people assembled together for an extended period, frequently in spaces that are poorly ventilated and lacking modern indoor air circulation systems that are prevalent and often mandated in workplaces. Singing and chanting, because they lead an infected person to emit more viral droplets and particles farther, promote the spread of SARS-CoV-2. By contrast, for example, supermarkets tend to pose a significantly lower risk of spread, as any proximity among individual shoppers generally is fleeting and occurs in a larger, well-ventilated space.

Based on established principles of epidemiology, and broad scientific consensus about how SARS-CoV-2 spreads, we believe that California's restrictions on indoor

worship services (and similar indoor cultural events) are not only sensible, but critical. We also believe that California's regime treats like activities alike, and that it would be irresponsible and dangerous to nullify the science-based distinctions the State has drawn.

ARGUMENT

I. The latest scientific evidence confirms that COVID-19 spreads most easily in large extended indoor gatherings, especially if people are talking loudly or singing.

COVID-19 spreads quickly within and between communities, threatening everyone and especially the elderly, those with underlying health conditions. Over the last ten months, scientists, doctors, and public health officials have learned several important facts that are key to reducing transmission. These facts build upon and reinforce well known principles of epidemiology and public health.

A. Most transmission is respiratory.

Most transmission of COVID-19 is respiratory, through emissions from an infected person's nose or mouth of either liquid droplets (typically defined as being over 5 microns in size) or smaller aerosolized particles containing the virus.[4] These droplets and aerosolized particles, once they leave an infected person's nose or mouth, can remain suspended in air and even be recirculated through air handling units.[5] They can then land in the mouths, noses, or eyes of people who are nearby or be

[4] *See* WHO, Coronavirus disease (COVID-19): How is it transmitted?, https://www.who.int/news-room/q-a-detail/q-a-how-is-covid-19-transmitted.

[5] *See* Lu J, et al. COVID 19 outbreak associated with air conditioning in restaurant, Guangzhou, China, 2020. *Emerg Infect Dis* (July 2020) 26:1628-31, *available at* https://wwwnc.cdc.gov/eid/article/26/7/20-0764_article.

inhaled into their lungs. Droplets that do fall to the ground generally do so within six feet of the person who emitted them, though they can be transmitted further, for example, if an infected person coughs, sneezes, or speaks loudly.[6]

By contrast, transmission via touching an infected object and then touching one's eyes, nose, or mouth (called "fomite transmission") appears to be possible, but rare.

B. Dose matters.

Whether a person becomes infected—and whether they develop symptoms and ultimately survive—depends on the dose to which they are exposed, which itself depends on what is called the viral load of the person infecting them and shedding virus.[7] Viral load is the number of viable viral particles per milliliter in a person's oral or nasal secretions. Viral load matters in two different ways. First, the higher the load in an *infected* person, the more viral droplets and aerosolized particles they emit from their nose and mouth when breathing, talking, singing, coughing, or sneezing. Both infected people who display symptoms and those who do not (asymptomatic people) generally have viral loads that make them contagious for approximately 13 days, and go through a period of peak viral load early in infection, though that peak may be somewhat lower in asymptomatic people.

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[6] *See* Hongying Li, et al. Dispersion of evaporating cough droplets in tropical outdoor environment. *AIP Physics of Fluids* (Nov. 3, 2020), *available at* https://aip.scitation.org/doi/10.1063/5.0026360.

[7] A recent study in The Lancet found that viral load predicts mortality in COVID-19 patients. Elisabet Pujadas et al. SARS-CoV-2 viral load predicts COVID-19 mortality. *Lancet Respir. Med.* (Aug. 6, 2020), *available at* https://www.thelancet.com/journals/lanres/article/PIIS2213-2600(20)30354-4.pdf.

Second, an *uninfected* person needs to receive a certain dose for the virus to overcome the body's defenses and cause infection. The proximity of a non-infected person to an infected person, the length of time they spend in proximity, and the viral load of the infected person all affect the dose the uninfected person will receive. In other words (other things being equal), the longer and closer the contact between a person producing infectious respiratory droplets and particles and an uninfected person, the more likely that second person will receive a high enough dose to become infected. (And the more persons in such proximity to an infectious person, for longer, the greater the number she will infect.)

C. Asymptomatic carriers play a large role in spreading COVID-19.

Approximately 40 percent of infected people have no symptoms. Of the remaining 60 percent, two-thirds will experience only mild symptoms. But those two subgroups—who may never even know they were infected—remain contagious, and they play a significant role in the spread of COVID-19. Indeed, a wealth of evidence supports the conclusion that asymptomatic and mildly-symptomatic people infect *more* people than those experiencing significant, perceptible symptoms.[8] Accordingly, keeping overall case counts low is critical—because while any particular infected

[8] *See* Xi He, et al. Temporal dynamics of viral shedding and transmissibility of COVID-19. *Nature Medicine*, vol. 26 (Apr. 15, 2020), pp. 672-675, *available at* www.nature.com/articles/s41591-020-0869-5; M. Ghandi, et al. Asymptomatic Transmission, the Achilles Heel of Current Strategies to Control Covid-19. *The New England Journal of Medicine* 382:2158 (May 28, 2020), *available at* https://www.nejm.org/doi/full/10.1056/NEJMe2009758; Wycliffe E. Wei, et al. Presymptomatic transmission of SARS-CoV-2-Singapore, January 23-March 16, 2020. *CDC Morbidity and Mortality Weekly Report*, vol. 69 (Apr. 1, 2020), *available at* https://www.cdc.gov/mmwr/volumes/69/wr/mm6914e1.htm.

person may not suffer substantial harm, she may yet, unwittingly spread disease to multiple others who will become seriously ill. This means that when a person chooses to attend a gathering, that person does not just risk becoming *infected* themselves, but also risks becoming *infectious* to others who did not choose to attend such an event. For example, a wedding reception with 55 guests in a small rural town in Maine led to outbreaks in the local community, as well as to a nursing facility and a correctional facility in other counties.[9] There were 177 COVID-19 cases linked to the event, including 7 hospitalizations and 7 deaths. None of those hospitalized or who died attended the wedding.

On average, people who have symptomatic cases of COVID carry slightly higher amounts of virus than do infected, but asymptomatic, ones. And symptomatic people are, unsurprisingly, more likely than asymptomatic ones to spread the disease through coughing and sneezing, two symptoms of COVID-19. But symptomatic people make up a minority of those infected and are more likely to stay at home and refrain from activities and interactions that would transmit the virus to others. By contrast, asymptomatic and mildly symptomatic people make up the majority of infected people. And these asymptomatic and mildly symptomatic carriers, who seldom know they are infected and infectious, do not take comparable precautions. Accordingly, epidemiologists believe that asymptomatic and mildly symptomatic infected people

[9] Parag Mahale, et al. Multiple COVID-19 outbreaks linked to a wedding reception in rural Maine, August 7-September 14, 2020. *CDC Morbidity and Mortality Weekly Report*, vol. 69 (Nov. 13, 2020), *available at* https://www.cdc.gov/mmwr/volumes/69/wr/mm6945a5.htm.

are playing a larger role than symptomatic people in spreading the disease. That means that creating rules relating to the activities of asymptomatic carriers is critical to protecting the broader public's health.

D. Large indoor gatherings fuel the spread.

The foregoing three facts combined lead to a number of conclusions relevant to protecting people.

First, because transmission is respiratory, and the dose matters, the risk of spreading COVID-19 is significantly higher in indoor spaces. Indoors, droplets and particles are trapped in a finite space.[10] By contrast, there is much lower risk outdoors because droplets and aerosolized particles will disperse into much greater volumes of air—essentially an infinitely greater volume. In one published study, the authors found that the odds of transmitting COVID-19 in a closed environment were 18.7 times greater than in an open-air environment.[11] In another study of municipalities in China, all but one of 318 outbreaks involved indoor transmission.[12] For the same reason, the risk also increases where there is limited or poor ventilation.[13]

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[10] Leclerc QJ, et al. What settings have been linked to SARS-CoV-2 transmission clusters? *Welcome Open Res* (2020), *available at* https://wellcomeopenresearch.org/articles/5-83.

[11] Nishiura H, et al. Closed environments facilitate secondary transmission of coronavirus disease 2019 (COVID-19). *Welcome Open Res* (2020), *available at* https//www.medrxiv.org/content/10.1101/2020.02.28.20029272v2.full.pdf.

[12] Hu Quian, et al. Indoor transmission of SARS-CoV-2, *medRxiv* (April 4, 2020), *available at* https://www.medrxiv.org/content/10.1101/2020.04.04.20053058v1.

[13] *See* CDC Interim guidance for businesses and employers responding to coronavirus disease 2019 (COVID 19) (May 2020), https://www.cdc.gov/coronavirus/2019-ncov/community/guidance-business-

Second, the risk of contagion increases when groups gather for an extended period. The longer a person spends in proximity to an infected person the more likely that person is to receive a high enough dose to become infected.

Third, the more people that gather, the higher the likelihood that an infected person will be present without even knowing it, and the higher the number of people who may become infected.[14] In turn, the greater number of secondarily infected people (those who did not attend the gathering, but became infected by someone who did), the faster the exponential spread of the virus will be in a community. These concerns intensify when people who do not interact on a daily basis (i.e., are not in the same "bubble") gather together because they may spread the virus to many different communities and to elderly and vulnerable people within their close circles

The scientific community has concluded that there probably *are not* individuals who have unique characteristics causing them to be "super-spreaders." Rather, it appears that outbreaks stem from an infectious individual's engaging in a group activity or being in close proximity to many others for an extended period at a point when the person has a high viral load.[15] Indeed, there is a consensus among public health experts that a high percentage of the transmission of COVID-19 has occurred

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response.html (noting that the degree of risk is affected by the level of air exchange and that mitigating the risk requires at least six air exchanges per hour).

[14] A basic widely accepted epidemiological concept is that any gathering of people increases the risk of individual and community transmission. *See* CDC, COVID-19 Risk, https://www.cdc.gov/coronavirus/2019-ncov/hcp/faq.html.

[15] Goyal A. Reeves DP, et al. Person, place and time: viral load and contact network structure predict SARS-CoV-2 transmission and super-spreading events. *medRxiv* (Aug. 7, 2020), *available at* https://www.medrxiv.org/content/10.1101/2020.08.07.20169920v3.

in clusters, sometimes resulting from particular "super-spreading" events. For example, a study of COVID morbidity in Hong Kong found that 80 percent of the cases were attributable to such outbreaks and super-spreading events.[16] A study of clusters in Japan over the period January-April 2020 found that "many COVID-19 clusters were associated with heavy breathing in close proximity, such as singing at karaoke parties, cheering at clubs, having conversations in bars, and exercising in gymnasiums."[17] Quick action to reduce these "super-spreading" events is key to slowing the virus's spread.

Ultimately, large group gatherings, particularly in indoor spaces that are poorly ventilated, present an exceptional risk of transmission of COVID-19.

II. To slow the spread of COVID-19, it is critical to control the activities that pose the highest risk of widespread transmission.

The scientific facts discussed in Section I inform decisions about the relative risks that different activities pose. Because indoor religious services combine all of the risk factors discussed, they are particularly likely to lead to the spread of COVID-19 in communities. Other activities, like shopping at a supermarket or retail store or protesting outdoors are less likely to lead to the spread of COVID-19.

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[16] Adam DC, et al. Clustering and super-spreading potential of severe acute respiratory syndrome coronavirus 23.18 (SARS-CoV-2) infections in Hong Kong. *Nature Medicine* (Sept. 17, 2020), *available at* https://www.nature.com/articles/s41591-020-1092-0.

[17] Yuki Furuse, et al. Clusters of Coronavirus Disease in Communities, Japan, January-April 2020. *Emerging Infectious Diseases* (September 2020), available at https://wwwnc.cdc.gov/eid/article/26/9/20-2272_article.

A. Indoor religious services, like indoor performances or demonstrations, are particularly high-risk activities for the spread of COVID-19.

The activities that present the highest risk of COVID-19 transmission are thus those which occur indoors, in poorly ventilated spaces, where many people from different social "bubbles" congregate in close proximity for an extended period. This includes indoor cultural events and performances, indoor demonstrations, and indoor religious worship services.

The risk posed by gatherings at houses of worship and indoor protests is particularly acute because congregants often sing, chant, and vocalize at such gatherings. There is much evidence—developed well before the emergence of COVID-19—that singing is a risk factor for transmitting a wide array of respiratory infections.[18] This is because these activities involve greater exhalation force, causing the release of a larger number of virus-bearing droplets and particles. The greater exhalation force also increases the distance that droplets and aerosolized particles can travel compared to when people speak at a normal volume. As explained above, dose matters, and the more particles that reach another uninfected person, the higher

[18] *See, e.g.*, Buonanno G, et al. Quantitative assessment of the risk of airborne transmission of SARS-CoV-2 infection: Prospective and retrospective applications. *Environ Int.* (Sept. 6, 2020) 145:106112; Marks JS et al. Saturday night fever: a common-source outbreak of rubella among adults in Hawaii. *Am J Epidemiol* (Oct. 1981); Mastorides, SM et al. The detection of airborne Mycobacterium tuberculosis using micropore membrane air sampling and polymerase chain reaction. *Chest* (Jan. 1999); Sacks, JJ et al. Epidemiology of a tuberculosis outbreak in a South Carolina junior high school. *Am J Public Health* (Apr. 1985); 75(4):361-5.

the likelihood that she will receive a viral load sufficient to cause a COVID-19 infection.[19]

Although wearing a mask or face covering while singing decreases the risk of transmission, it does *not* remove the risk. Researchers studied the viral particles produced by persons with COVID-19 during breathing, talking, and singing with and without a face covering. They discovered that when infected persons sang, they produced a number of droplet particles comparable to those produced through ordinary speech *without a mask*.[20]

Indoor worship services, as well as other indoor cultural events or protests, thus *combine* all of the risk factors discussed. They occur indoors, where viral droplets and particles are trapped, and are often in older buildings that are not equipped with adequate methods of ventilation. Worship services often last for an extended period of time. They typically involve large numbers of people from different social "bubbles" gathering for the purpose of being together. And they often involve substantial

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[19] The best known example is the choir practice in Skagit County, Washington. Even though the singers were spaced more than six feet apart, an outbreak occurred: 52 out of 61 attendees were found to have contracted confirmed or probable COVID-19 infections at the practice, and two died. Scientists postulate that singing together was a key factor in the outbreak. Lea Hamner, et al. High SARS-CoV-2 Attack Rate Following Exposure at a Choir Practice—Skagit County, Washington, March 2020, *available at* https://www.cdc.gov/mmwr/volumes/69/wr/mm6919e6.htm. *See also* Allison James et al. High COVID 19 Attack Rate Among Attendees at Events at a Church in Arkansas (March 2020) (describing another outbreak following house of worship events that involved singing), *available at* https://www.cdc.gov/mmwr/volumes/69/wr/mm6920e2.htm.

[20] M. Alsved, et al. Exhaled respiratory particles during singing and talking. *Aerosol Science & Tech* (2020), DOI, *available at* https://www.Tandfonline.com/doi/full/10.1080/02786826.2020.1812502.

communal singing or other group vocalizations. Accordingly, indoor services at houses of worship pose a distinctly high risk for the transmission of COVID-19.

B. Supermarket shopping and other activities subject to different controls do not pose comparable risks for the spread of COVID-19.

We understand that applicants have identified various activities, including shopping at a supermarket, protesting outdoors, making deliveries, working in factories, or providing other services (like food distribution) in houses of worship, that they believe pose comparable COVID transmission risks, but are, in their view, subject to lighter regulation in California. These activities, while presenting risks, present significantly lower transmission risks than does participating in indoor worship services and the other indoor cultural activities that are subject to in-person attendance limits. None presents the *combination* of factors that render indoor worship services so conducive to spreading the virus. And some of them are subject to other stringent and intrusive control measures (distinct from numerical attendance limitations) that would be infeasible or intolerable in regulating the conduct of religious ceremonies.

Shopping at a supermarket or other retail store generally involves less close proximity between shoppers than there is between congregants at an indoor worship service. And proximity is of significantly shorter duration—passing another shopper in the aisle or waiting in a check-out line, not sitting beside, in front of, or behind the same infected (if asymptomatic) fellow congregant for an hour or longer. Shoppers

generally have an intention to get in and out as soon as possible; worship participants attend services for the purpose of assembling with other congregants.[21]

In addition, retail stores—and in particular supermarkets and "big-box" retail outlets like Home Depot, Walmart, and Costco—tend to be much larger in size, of more recent construction, and better ventilated than are houses of worship. Supermarkets are almost always equipped with high-functioning ventilation and air-conditioning systems, required by occupational health and safety codes and to preserve perishable products. And, of course, shoppers do not generally sing or engage in loud vocalizations. As a consequence of all of these factors, shoppers are less likely to receive a viral load of droplets or aerosolized particles sufficient to overcome their defenses to COVID-19 than congregants at houses of worship.

Likewise, the risk of transmission at an *outdoor* protest is materially different than in an *indoor* religious service or similar *indoor* political or cultural activity. As explained *supra* p. __, the risk of transmission of SARS-CoV-2 indoors is much greater because viral particles are trapped in a contained space and thus more likely to enter the eyes, nose or mouth of a non-infected person. By contrast, the air within which the virus disperses outside is infinitely greater. For example, in the study, discussed *supra* p. __, of 318 clusters in China (a cluster was defined as three or more cases linked to the same infection venue) researchers found that all 318 occurred indoors.[22]

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[21] Interactions with delivery people are similarly fleeting and often occur outdoors, making such contact significantly less likely to spread the virus than congregating with other worshippers or religious service leaders.

[22] *See* Hu Quian, et al. Indoor transmission of SARS-CoV-2, *supra* n. 12.

The study found only a single example of transmission outdoors, involving 2 people. Few cases of COVID-19 have been linked to outdoor transmission. Notably, the State of California permits outdoor worship services throughout the State, without any cap on attendance.

Attendance at college classes, as currently regulated by California, likewise does not present a comparable risk to attending an indoor religious service at a house of worship without attendance caps. Indeed, California's restrictions place similar caps on attendance at regular college lectures. In counties where COVID-19 cases are highest, the *only* in-person college classes that are permitted are laboratory and studio art classes that are focused on individual project-based work.[23] These activities do not involve gathering large numbers of people for extended periods of time or loud vocalization. Typically, class sizes are kept small; all students and instructors are required to wear masks; physical distancing rules are followed; class times are kept short; and classrooms have ventilation and filtration, all of which significantly mitigate transmission risk.

Plaintiffs' claims that other activities such as working in factories, warehouses, and on movie sets pose comparable COVID transmission risks than do indoor worship activities ignore other State- or centrally-mandated risk reduction measures, beyond attendance restrictions, that operate in those settings. Although there have been a number of significant COVID-19 outbreaks at factories, the State has vast power to

[23] California All, Industry guidance to reduce risk, https://covid19.ca.gov/industry-guidance/ ("Higher Education" dropdown).

protect workers from dangerous conditions, oversee and alter factory operations, and to punish violators. By contrast, it does not have the same power to dictate the conduct of religious services. Employers must perform comprehensive risk assessments of all work areas and, where infection is a hazard, implement infection control measures such as installing physical (often plexiglass) barriers or air filtration systems.[24] In the outbreaks of which we are aware, investigations have revealed that failure to adhere to state and federal workplace safety requirements were to blame.[25]

Earlier in this litigation, applicants focused great attention on the comparison to indoor dining at restaurants. But since the initiation of this litigation, the State *has barred* indoor dining at restaurants in counties where transmission is widespread.[26] This does not mean that the State was wrong when it recognized that indoor worship services posed a distinct higher risk, but rather that the risks of indoor

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[24] The federal Occupational Safety and Health Administration, for example, requires that office buildings have 4-12 air changes per hour (29 CFR Part 19010.1450). *See* OSHA, Guidance on Preparing Workplaces for COVID-19, https://www.osha.gov/Publications/OSHA3990.pdf; *see also, e.g.*, Cal/OSHA COVID-19 General Checklist for Manufacturing Employees (Jul. 2, 2020), https://files.covid19.ca.gov/pdf/checklist-manufacturing.pdf.

[25] As for working on a movie set, it is our understanding that only performers and crew members who have tested negative on a COVID-19 diagnostic test in the preceding 72 hours are permitted and those involved in singing performances must re-test daily (and that all singers must be arranged in patterns that minimize transmission). *See* SAG-AFTRA COVID-19 Safety Protocols: Singers, https://www.sagaftra.org/files/sa_documents/SingersProtocols.pdf.

[26] *See* Blueprint for a Safer Economy, https://www.cdph.ca.gov/Programs/CID/DCDC/CDPH%20Document%20Library/COVID-19/Dimmer-Framework-September_2020.pdf.

dining are now *also* too great to permit it in the hardest-hit places, and it only serves to underscore that the regime the State has put in place is dynamic and data-driven.

Finally, applicants argue that the State treats religious worship services unfairly because it permits other activities, like food distribution, counseling, or providing social services to occur in the same houses of worship, without subjecting them to the same numerical limits. But even though they occur in the same physical spaces, these activities do not present the same risks and combination of risks that indoor religious worship services do. For example, a minister counseling a single couple, or a handful of volunteers distributing food to people who come and go at different times, do not present the same COVID-19 transmission risks. Numbers aside, such activities do not entail the kinds of sustained assembling and frequent, collective vocalizations that elevate risks of transmission during worship services.

Ultimately, *none* of the activities plaintiffs have suggested are comparable present the same combination of risk factors as indoor worship services.

CONCLUSION

COVID-19 is a serious public health threat. It has already killed almost a quarter of a million Americans. There is a consensus among public health experts that extraordinary protective measures are warranted. In particular, the activities that pose the highest risk of transmission—large indoor gatherings in which people spend long periods of time together in poorly ventilated spaces—must be restricted. We believe California's data-driven response is supported by epidemiology and is wise (indeed, necessary) to slow the spread of this dangerous virus.

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Respectfully submitted,

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