

**IN THE UNITED STATES DISTRICT COURT
FOR THE MIDDLE DISTRICT OF NORTH CAROLINA**

DEMOCRACY NORTH CAROLINA, THE
LEAGUE OF WOMEN VOTERS OF NORTH
CAROLINA, DONNA PERMAR, JOHN P.
CLARK, MARGARET B. CATES, LELIA
BENTLEY, REGINA WHITNEY EDWARDS,
ROBERT K. PRIDDY II, WALTER
HUTCHINS, AND SUSAN SCHAFFER,

Plaintiffs,

vs.

THE NORTH CAROLINA STATE BOARD OF
ELECTIONS; DAMON CIRCOSTA, in his
official capacity as CHAIR OF THE
STATE BOARD OF ELECTIONS; STELLA
ANDERSON, in her official capacity
as SECRETARY OF THE STATE BOARD OF
ELECTIONS; KEN RAYMOND, in his
official capacity as MEMBER OF THE
STATE BOARD OF ELECTIONS; JEFF
CARMON III, in his official
capacity as MEMBER OF THE STATE
BOARD OF ELECTIONS; DAVID C. BLACK,
in his official capacity as MEMBER
OF THE STATE BOARD OF ELECTIONS;
KAREN BRINSON BELL, in her official
capacity as EXECUTIVE DIRECTOR OF
THE STATE BOARD OF ELECTIONS; THE
NORTH CAROLINA DEPARTMENT OF
TRANSPORTATION; J. ERIC BOYETTE, in
his official capacity as
TRANSPORTATION SECRETARY; THE NORTH
CAROLINA DEPARTMENT OF HEALTH AND
HUMAN SERVICES; MANDY COHEN, in her
official capacity as SECRETARY OF
HEALTH AND HUMAN SERVICES,

Defendants.

Civil Action No. 20-

cv-457

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**DECLARATION OF MEGHAN MURRAY IN SUPPORT OF PLAINTIFFS’
MOTION FOR PRELIMINARY INJUNCTION**

1. I am the Ronda Stryker and William Johnston Professor of Global Health in the Department of Global Health and Social Medicine at the Harvard Medical School, a Professor of Epidemiology at the Harvard Chan School of Public Health, a faculty member of the Center for Communicable Disease Dynamics at the Harvard Chan School of Public Health and an associate Professor of Medicine at the Harvard Medical School and the Brigham and Women's Hospital. I obtained my BA from Dartmouth College in 1980, after which I worked for the Intergovernmental Committee for Migration (now IOM) heading up a public health screening program for refugees being resettled from refugee camps in Thailand. I obtained my MD from Harvard Medical School in 1990 and my ScD (doctorate in science) in Epidemiology from the Harvard School of Public Health in 2001. I completed a residency in internal medicine in 1993 and a fellowship in the sub-specialty of Infectious Diseases in 1995, both at the Massachusetts General Hospital in Boston.

2. Over the past 20 years, I have worked in the field of infectious disease dynamics and epidemiology, teaching and conducting research in emerging infectious diseases and in tuberculosis epidemiology and control. At the Harvard Chan SPH, I taught the basic epidemiology course *Infectious Disease Dynamics* between 2000 and 2016, and I have directly supervised the research of over 40 graduate students and post-doctoral fellows in these fields. Attached here as Exhibit A and incorporated by reference to this declaration is a copy of my curriculum vitae.

3. I have conducted research and have published on the transmission dynamics of SARS-CoV-1 in 2003, the 2010 cholera epidemic in Haiti, and on the 2015 Ebola

outbreak, although most of my research is in the field of tuberculosis. I have published over 200 research articles. My work includes dynamic modeling of epidemics (TB, Cholera, Ebola, SARS-CoV-1, SARS-CoV-2); cohort studies on host and pathogen specific determinants of disease transmission and the development of novel diagnostic tools for the diagnosis of infectious diseases. I have been funded by the National Institute of Infectious Disease and Allergy since 1995 and have led, and currently lead, several major consortium projects on tuberculosis funded by this agency.

4. At the Harvard Medical School, I lead the Global Health Research Core of the Harvard Medical School, which conducts research in more than ten countries on a range of topics including emerging infectious diseases. I head up research at the Division of Global Health Equity at the Brigham and Women's Hospital and also direct research at the non-governmental organization, Partners in Health. I have served as an associate editor of the European Journal of Epidemiology, the Journal of the International Union against TB and Lung Disease and of PLoS (Public Library of Science) Medicine. I am the co-lead of the Epidemiology working group of the Massachusetts Consortium for Pathogen Readiness.

5. I am currently collaborating on research concerning SARS-CoV-2 and its incidence, as well as serving on Covid-19 advisory groups for multiple organizations, including the State of Massachusetts and Harvard University. My research in this area includes, but is not limited to, modeling and estimating the number of hospital beds that will be required in the US and elsewhere, developing methods on syndromic surveillance

for Covid-19 for low and middle-income countries, identification of risk factors for poor outcomes and the use of the vaccine, BCG, to prevent Covid-19 disease. To date (May 11, 2020), I have published two papers in this area and have three others under review.

OVERVIEW

6. **SARS-CoV-2 is a newly identified coronavirus that is the causative agent involved in Coronavirus Disease 2019 (Covid-19). SARS-CoV-2 infection can result in an asymptomatic infection or in symptomatic disease which ranges from mild to severe.** Most people who develop symptomatic Covid-19 have a flu-like illness that starts out with fever, cough, sore throat and shortness of breath. A subset of people who are infected will go on to develop much more serious illness, characterized by respiratory compromise and acute respiratory distress syndrome (ARDS). Other serious manifestations of Covid-19 have included cardiac problems: arrhythmias, acute cardiac injury, and shock.

7. Because Covid-19 is a new disease, it is too early to know the full extent of long-term medical consequences of the infection. However, some information can be inferred from the courses of diseases with similar manifestations. Patients who develop ARDS and/or are mechanically ventilated are likely to develop lung scarring that may permanently impair their pulmonary function [1]. Patients who end up in ICUs or on mechanical ventilation for extended periods often develop post-ICU syndrome which prolonged physical debilitation, muscle atrophy, neurocognitive impairments and emotional/psychiatric responses that are similar to post-traumatic stress syndrome.

Although Covid-19 has been reported in people of all ages, older people and those with co-morbidities (concurrent illnesses) are most likely to develop severe disease.

8. **Covid-19 is a respiratory virus which is spread by symptomatic and asymptomatic people through respiratory droplets, meaning drops of fluid from the nose or mouth that are emitted during coughs, sneezes or even talking.** Some of the viral particles emitted this way end up on surfaces (door handles, coins) where they can remain viable. It has also been shown that Covid-19 can be transmitted as an aerosol – in other words, through the airborne route, *i.e.*, direct inhalation of virus suspended in the air.

9. **Control of SARS-CoV-2 spread is particularly difficult relative to some other viral infections because people can transmit the infection even when they do not have symptoms of the disease.** This means that the practice of isolating patients with symptomatic disease will not be enough by itself to control epidemic spread. In contrast, infections like smallpox and SARS-CoV-1 were not infectious until symptoms had developed so isolation of ill people had a substantial impact on epidemic control. In the absence of a vaccine or pharmaceutical interventions that interrupt transmission, infection control can only be achieved by reducing the number of contacts between infectious individuals (including those who are asymptomatic) and susceptible people.

10. Infectious disease epidemiologists have developed projections of the future trajectory of Covid-19 incidence based on modeling the epidemic and possible interventions. Although these models differ in terms of specifics, they consistently show that it is highly likely that the relaxation of social distancing measures that will occur with

the end of “lock-down” will increase the number of social contacts that people make and that the incidence of infection will increase accordingly. In particular, these models predict that transmission of SARS-CoV-2 will continue or increase in the fall and winter, leading to further morbidity and mortality from this disease.

11. There is a substantial risk that an infection with Covid-19 acquired during voting at a poll booth in North Carolina in the fall of 2020 could result in symptomatic disease, hospitalization or death. The risk of an individual being infected during voting at a polling booth in fall 2020 depends on the number of infectious people in that community at that time point and the number of physical, fomite-mediated and near contacts one makes during that process. To the extent that polling places are crowded, require people to wait in lines, involve interacting with polling staff or other voters at a close distance, move people through the process slowly, are poorly ventilated, and/or involve people touching objects like pens, paper, or surfaces within the voting booth, they constitute a risk to voters. Similarly, if voters or poll workers use toilets that are also used by others, they can be put at risk. North Carolina has relatively high rates of the co-morbidities that predispose people to poor outcomes from Covid-19.

12. *I was asked to describe the novel coronavirus that causes Covid-19.* SARS-CoV-2 is a newly identified coronavirus that is the causative agent involved in Coronavirus Disease 2019 (Covid-19) [1]. It is a single-stranded RNA virus of the Coronavirus family. Previously identified coronaviruses are known to infect a wide range of hosts including wild and domestic animals and birds as well as humans. Six human coronaviruses have

been identified over the past 60 years; four of them (OC43, 229E, NL63, and HKU1) cause mild cold-like symptoms and/or gastrointestinal tract infections. Two that have caused more serious illness include the severe acute respiratory syndrome coronavirus (SARS-CoV-1) that emerged in China in 2003 and the Middle East respiratory syndrome coronavirus (MERS-CoV) that was first identified in humans in Saudi Arabia in 2012. SARS- and MERS-CoVs are believed to have originated in bats and transferred to humans through intermediary hosts, possibly palm civets for SARS or dromedary camels for MERS. The coronaviruses that are most similar to SARS-CoV-2 are those identified in horseshoe bats – these share 96 percent of their genetic material with SARS-CoV-2 while the earlier SARS virus shared 80 percent and cold viruses mentioned above share about 50 percent [2].

13. Like SARS-CoV-1, SARS-CoV-2 infiltrates human cells by binding to the receptor for ACE2 (angiotensin converting enzyme) and then being taken up by these cells, where it directs the production of new virus particles (virions) using the host's genetic machinery [3]. Like other viruses, SARS-CoV-2 virions consist of a “core” which contains the genetic material, a “capsid” which is a protein coat and a lipid envelope. Upon assembly in the host cell, newly-produced virions are released from the host cell and go on to infect new host cells. To some extent, the clinical manifestations of the disease are related to the types of cells that have the receptor to which the virus binds and to the inflammatory responses that are induced by the host immune response to the infection. While ACE2 receptors were well-known to be present on vascular endothelial cells (blood vessels) and

renal tubular cells (kidney), they have also been found to be abundant on alveolar epithelial cells (lung), enterocytes (gut), heart cells, brain cells and in cells in the inner lining of the nose [4]. This diverse distribution helps explain the wide constellation of symptoms and syndromes that are increasingly being recognized as part of Covid-19 disease.

14. *I was asked to characterize clinical features of Covid-19.* SARS-CoV-2 infection can result in an asymptomatic infection or in symptomatic disease which ranges from mild to severe. The term Covid-19 refers to the illness that is caused by SARS-CoV-2. Most people who develop symptomatic Covid-19 have a flu-like illness that starts out with fever, cough, sore throat and shortness of breath. As clinicians have gained more experience with the disease, it is now becoming clear that the initial presentation of the disease can also include a variety of other symptoms including gastrointestinal issues such as nausea, vomiting and diarrhea, loss of a sense of taste and/or smell, headache and muscle pain and in some cases, particularly in the elderly, altered neurological states such as confusion, lethargy and reduced responsiveness. The Centers for Disease Control and Prevention (CDC) have recently expanded their list of symptoms associated with Covid-19 from fever, shortness of breath and cough to include chills, muscle pain, headache, sore throat and new loss of taste or smell [5]. On average, among those who present with these symptoms, fever persists for around 12 days, shortness of breath for 13 days and cough for about 19 days. According to the World Health Organization (WHO), recovery time appears to be around two weeks for mild infections and three to six weeks for severe disease [6].

15. A subset of people who are infected will go on to develop much more serious illness, characterized by respiratory compromise due to pneumonia that can be gradual or sudden. Some patients who initially reported only mild symptoms may progress to severe disease over the course of a week. In one study of 138 patients hospitalized in Wuhan, China, for pneumonia due to SARS-CoV-2, dyspnea (severe shortness of breath) developed approximately five days after the onset of symptoms, and hospital admission occurred after around seven days after the onset of symptoms [7].

16. Acute respiratory distress syndrome (ARDS) is the major complication in patients with severe disease. In the study cited above, ARDS developed in 20 percent of hospitalized patients around eight days after the onset of symptoms and 12.3 percent of this group required mechanical ventilation [7]. In another study of 201 hospitalized patients with Covid-19 in Wuhan, 41 percent developed ARDS [8]. Some patients with severe Covid-19 have an overactive inflammatory response, sometimes termed a “cytokine storm,” which is characterized by persistent fevers and laboratory abnormalities including high levels of inflammatory markers and elevated proinflammatory cytokines. People with these types of laboratory abnormalities are those most likely to have critical or fatal illness.

17. Other serious manifestations of Covid-19 have included cardiac problems: arrhythmias, acute cardiac injury, and shock [9-11] which occurred in 17, 7, and 9 percent of hospitalized patients, respectively [7]. In a case series of 21 severely ill patients admitted to a US ICU, one-third developed cardiomyopathy (injury to the heart muscle) [12]. An alarming recent finding has been the association of Covid-19 with thromboembolic

complications (pulmonary embolism and stroke) that have been reported among patients in younger age groups and without known risk factors [13-15]. In one US-based case series, a single health facility reported on five Covid-19 patients with acute stroke who were seen over a two-week period; all of these people were under 50 years of age [14]. This incidence is more than seven times the rate reported in that age group prior to the pandemic. In one series of ICU patients, ischemic stroke was also noted observed in 3.7 percent of the patients [15].

18. Other rarer manifestations of Covid-19 include Guillain-Barré syndrome which can occur five to ten days after initial symptoms [16]. Guillain-Barré syndrome is a rare neurological syndrome characterized by an inflammation of nerve cells outside the brain. In serious cases, it can lead to paralysis which usually resolves after six months but which can be permanent in some cases. Another rare inflammatory syndrome that has been reported in Covid-19 occurs in children who have developed symptoms consistent with toxic shock syndrome and Kawasaki disease [17].

19. Because Covid-19 is a new disease, it is too early to know the full extent of long-term medical consequences of the infection. However, some information is already available, and some can be inferred from the courses of diseases with similar manifestations. Patients who develop ARDS and/or are mechanically ventilated are likely to develop lung scarring that may permanently impair their pulmonary function. [18]. In addition, patients who end up in ICUs or on mechanical ventilation for extended periods often develop post-ICU syndrome which includes a constellation of findings such as

prolonged physical debilitation, muscle atrophy, neurocognitive impairments and emotional/psychiatric responses that are similar to post-traumatic stress syndrome [19]. Patients that suffer strokes in the context of Covid-19 are very likely to experience long-term neurological deficits from these events.

20. Although Covid-19 has been reported in people of all ages, older people and those with co-morbidities (concurrent illnesses) are most likely to develop severe disease. Accurate case fatality rates are hard to obtain in the context of limited testing since we do not always know who actually has the infection. However, a compilation of the death rates across countries shows that older people are consistently more likely to die if they have detectable Covid-19 disease than are younger people [20]. The table below shows that the risk of death rises with each additional decade after age 50.

Table 1. Case Fatality rate by age groups. From Onder G, Rezza G, Brusaferro S. Case-Fatality Rate and Characteristics of Patients Dying in Relation to Covid-19 in Italy. *JAMA*. 2020;323 [18].

	Italy as of March 17, 2020		China as of February 11, 2020	
	No. of deaths (% of total)	Case-fatality rate, % ^b	No. of deaths (% of total)	Case-fatality rate, % ^b
All	1625 (100)	7.2	1023 (100)	2.3
Age groups, y				
0-9	0	0	0	0
10-19	0	0	1 (0.1)	0.2
20-29	0	0	7 (0.7)	0.2
30-39	4 (0.3)	0.3	18 (1.8)	0.2
40-49	10 (0.6)	0.4	38 (3.7)	0.4
50-59	43 (2.7)	1.0	130 (12.7)	1.3
60-69	139 (8.6)	3.5	309 (30.2)	3.6
70-79	578 (35.6)	12.8	312 (30.5)	8.0
≥80	850 (52.3)	20.2	208 (20.3)	14.8

^a Data from China are from Chinese Center for Disease Control and Prevention. ⁴ Age was not available for 1 patient.

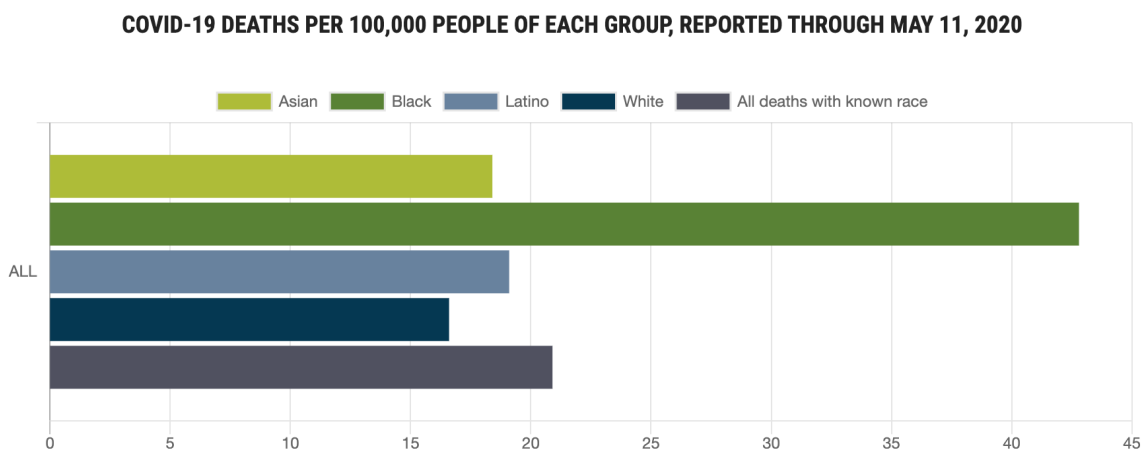
^b Case-fatality rate calculated as number of deaths/number of cases.

21. In addition to age, other risk factors for severe disease and death include hypertension, heart disease, lung diseases (e.g., asthma, chronic obstructive pulmonary

disease (COPD)), diabetes mellitus, obesity, and chronic kidney disease. In one recent study of 5700 Covid-19 patients identified in New York City, 56.6 percent had pre-existing hypertension, 41.7 percent were obese (body mass index > 30) and 33.8 percent had diabetes mellitus [21]. Risk factors for death among patients with Covid-19 were recently ascertained in another study of 5,683 Covid-19 deaths in the United Kingdom [22]. In this report, men were twice as likely to die as women; people with obesity 2.3 times as likely to die as those of normal weight; people with uncontrolled diabetes 2.36 times than non-diabetics, people with organ transplants 4.3 times than their healthy counterparts. In both Britain and the US, there are marked disparities in deaths by race: 33 to 42 percent of deaths in the US have reportedly occurred in African Americans, while only 12 to 13 percent of the total US population is African American [23]. Figure 2 provides comparative death rates from Covid-19 from the APM research lab (<https://www.apmresearchlab.org/>).

Table 2 Covid-19 Death Rate by ethnic group. (From APM Research Lab)

<https://www.apmresearchlab.org/>



**Includes data from Washington, D.C., and the 39 states of Alabama, Alaska, Arizona, Arkansas, California, Colorado, Connecticut, Delaware, Florida, Georgia, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, New Hampshire, New Jersey, New York, North Carolina, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Carolina, Tennessee, Texas, Vermont, Virginia, Washington and Wisconsin. States employ varying collection methods regarding ethnicity data. Denominator is built from data aggregated from each state, aligned with their method.*

22. Although the Covid-19 case fatality rates are low in young individuals, it is important to note that multiple seroprevalence studies (studies that detect previous infection in people) in several countries show that infection (as distinct from severe disease) is more common in people younger than 50, probably because they have more frequent social contacts than older people. Furthermore, the proportion of people in the US population under 50 years of age is 66%, meaning that even though the absolute risk for a young person is lower than for someone over 50, deaths among people under 50 will not be uncommon as the epidemic progresses over time.

23. *I was asked to explain how Covid-19 is transmitted and to describe interventions that could interrupt transmission.* SARS-CoV-2 can be transmitted in multiple ways, through respiratory droplets emitted during talking, singing, sneezing and coughing, via objects on which viral particles have been deposited, and through air. Importantly, the virus can be transmitted by people who are asymptomatic as well as by those who are demonstrably ill.

24. Covid-19 is a respiratory virus which is spread through respiratory droplets, meaning drops of fluid from the nose or mouth that are emitted during coughs, sneezes or even talking [52]. Some of the viral particles emitted this way end up on surfaces (door handles, coins) where they can remain viable. These objects then become “fomites,” defined as inanimate objects that can transfer infection between people. A recent study documented the stability of SARS-CoV-2 on a series of different surfaces over time [24]. The virus was found to be more stable on plastic and stainless steel than on copper and

cardboard with viable virus detectable for up to 72 hours after application to these surfaces although the virus titer was steadily reduced over those periods. On cardboard, viable SARS-CoV-2 was measured for 24 hours. Notably, this study also evaluated the stability of SARS-CoV-1 – the causative virus of the 2003 SARS epidemic – and found that it was very similar to SARS-CoV-2 despite the fact that SARS-CoV-2 has much more capacity to spread widely than SARS-CoV-1. The authors conclude that the “differences in the epidemiologic characteristics of these viruses probably arise from other factors, including high viral loads in the upper respiratory tract and the potential for persons infected with SARS-CoV-2 to shed and transmit the virus while asymptomatic.” [24]

25. It is also possible that Covid-19 is transmitted as an aerosol – in other words, through the airborne route, *i.e.*, direct inhalation of virus suspended in the air. The study cited above also assessed the stability of aerosolized SARS-CoV-2 over time. To do this, they used a nebulizer to generate aerosols that would be similar to those observed in samples obtained from the upper and lower respiratory tract in humans. SARS-CoV-2 remained viable in aerosols throughout the duration of the three-hour experiment, suggesting that aerosol spread of SARS-CoV-2 is indeed possible. These findings are consistent with case reports of Covid-19 patients who were infected in settings in which they did not have direct contact with others. In one case, 45 people were diagnosed with Covid-19 after attending a choir practice in Washington State in early March although they had no direct physical contact with each other [25]. The findings are also consistent with a report in the journal, *Nature*, where researchers found viral RNA in aerosols sampled in

February and March at two hospitals in Wuhan, China. The levels of airborne viral RNA in well-ventilated patient rooms were relatively low but there were higher levels in some of the patients' toilet areas, presumably aerosolized by the flushing mechanism.

26. High levels of viral RNA were also found in areas where medical workers remove their protective equipment and in locations near the hospitals where people tended to congregate. The authors concluded: "Our study and several other studies proved the existence of SARS-CoV-2 aerosols and implied that SARS-CoV-2 aerosol transmission might be a non-negligible route from infected carriers to someone nearby."

27. The transmissibility of any infectious agent depends on several things: the probability of an infection event given a contact between a susceptible person and an infectious person; the duration of infectiousness – or number of days that a person can transmit – and the number of contacts that an infectious person has per unit time. This means that the transmissibility can vary in different settings and will depend on things like crowding, which increases the number of contacts. Based on a summary of multiple studies, each infectious person with Covid-19 is expected to infect between 2 and 3 people on average [26]. But this term – "on average" – obscures the substantial variability observed in different people. Some people are much more infectious than others and other people do not transmit at all. Like many other respiratory infections, SARS-CoV-2 follows the 20/80 rule – meaning that most transmission is associated with 20 percent of the infectious people while the other 80 percent infect relatively few people. The factors that

lead to this kind of “super-spreading” are not clear and it is thus not possible to identify in advance those people who are likely to infect a large number of other people.

28. Control of SARS-CoV-2 spread is also made more difficult because people can transmit the infection even when they do not have symptoms of the disease. This can happen in two ways. Many people with SARS-CoV-2 infection have few if any symptoms – as more and more seroprevalence studies are being conducted to identify who has been infected, it is estimated that 50-60 percent of infected people never develop symptoms of the disease. Seroprevalence surveys are studies that look for the presence of antibodies to an infection in a blood sample; these are only present in people who have been exposed to the infection and have mounted an immune response. Secondly, people who develop Covid-19 disease experience a “pre-symptomatic” period during which they are infected but do not yet have symptoms. A recent study in the *New England Journal of Medicine* found that quantitative SARS-CoV-2 viral loads were similarly high in four different symptom groups; people with typical symptoms of Covid-19, people with atypical symptoms, people who were pre-symptomatic, and those who remained asymptomatic [27]. Notably, 71 percent of the samples taken from pre-symptomatic persons had viable virus for one to six days before the development of symptoms. Because viral load is an accepted proxy for infectiousness, these data imply that a significant proportion of transmission events originate from persons who do not have detectable infection.

29. ***What kinds of interventions are currently available that could interrupt or reduce transmission of SARS-CoV-2?*** In the absence of a vaccine or pharmaceutical

interventions that reduce the probability of transmission, there are a limited number of approaches to infection control, all of which involve restricting people's physical and social interactions. One can isolate people with symptomatic disease to try to prevent them from infecting others, but this will only be completely effective if people are diagnosed with the disease at or before the time that they become infectious. As noted above, in people who are infectious before they have symptoms or in infectious people who never develop symptoms at all, transmission can take place in the absence of symptoms. For diseases like this one, with significant asymptomatic spread, quarantine is used to separate and restrict the movements of people without signs of illness who may have been exposed to an infectious case so that they do not infect others during that period. Another approach is social distancing – this can range from asking people to stay at home or to avoid congregate settings such as schools, workplaces, or large gatherings. The purpose of social distancing is to reduce the number of person-to-person contacts one makes so that one is less likely to encounter an infectious person. Polls show that US adults practicing social distancing have 90% fewer contacts per day than those who are not social distancing. Those who completely or mostly isolate themselves generate about five contacts per day, compared with an average of 52 for those not attempting to isolate themselves [28].

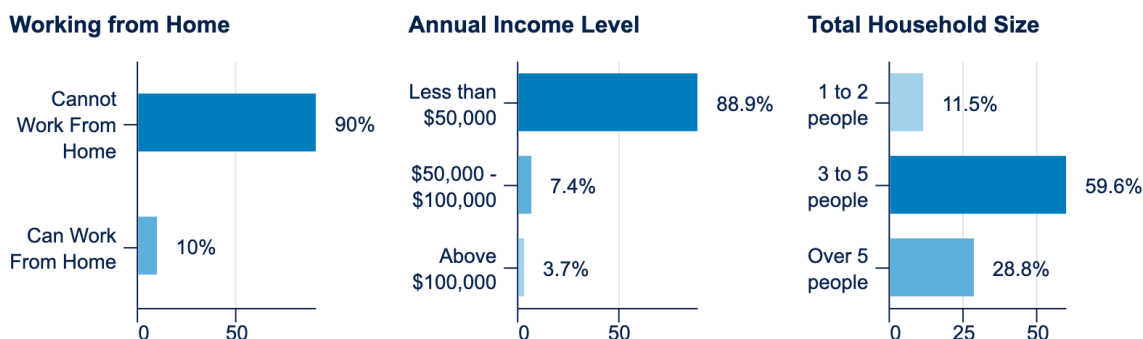
30. It is challenging to directly measure the actual efficacy of the non-pharmacological interventions to reduce the spread of an infection because these interventions are not randomly assigned to individuals and then evaluated in a head-to-head comparison of what happens to people in intervention and non-intervention groups.

One approach to estimating the impact of social distancing measures is to conduct studies that screen entire communities to determine who is actively infected at the time of screening. The researchers then correlate various characteristics of the people screened with the likelihood that they have been infected. Few such studies have been conducted to date but one that is informative was conducted in the Mission District of San Francisco. The research team offered free Covid-19 testing to all persons ages four years and older in an area that includes approximately 5,700 people (29). Of nearly 3,000 residents and workers in a Mission District census tract who were tested in late April for active infection with the novel coronavirus, 62 individuals (2.1 percent) have tested positive.

Table 3 Viral test positivity in Mission District of San Francisco [29]

Figure 3 Number of ascertained coronavirus disease (cases over time calculated by mathematical model with adults reducing their contact by 25% (A, B); 75% (C, D); and 95% (E, F). We used parameter values of $R_0 = 2.26$, $\gamma = 1/5.02$, $\sigma = 1/5.16$. Dotted lines represent the beginning and end of the 6-week social distancing interventions, after which contact rates return to normal. For panels A, C, and E, intervention starts at day 50 after identification of first case; for panels B, D, and F, intervention starts at day 80 after identification of first case.

Positive PCR Results by Socioeconomic Factors



31. The question of the efficacy of quarantine, isolation and social distancing depends on when in the course of the infection most transmission is taking place. If most transmission occurs during the asymptomatic period – as it does, say, for HIV – isolation

of patients with disease will have little impact. If on the other hand, most transmission takes place when people have identified themselves as ill (as it did for SARS-CoV-1 in 2002), isolation can be a very effective way to reduce spread. The benefits of quarantine – restricting the movements of people who are known to be in contact with an infectious case – depend on how effectively one can identify all contacts and prevent them from mixing with the general public. For obvious reasons, this can be very challenging and can have unintended consequences if quarantined people are housed together and become infected in that setting. Social distancing cannot prevent all transmission but could have a substantial impact on delaying transmission since contact rates are often much higher in congregate settings such as schools, prisons and other residential facilities. None of these measures is likely to lead to complete control of an epidemic since transmission is expected to resume once these are discontinued. But they may delay spread and give health systems time to develop better responses to the disease, whether those are new drugs, vaccines or simply improved efficiency of supportive care.

32. ***I was asked to address the likelihood that voting at polling stations could lead to SARS-CoV-2 transmission and Covid-19 disease.*** Because voting takes place in public buildings where people congregate and because the risks of infection and disease in the North Carolina population are high due to the high prevalence of comorbidities, voting at a polling station in November entails a substantial risk of infection with Covid-19 that could result in symptomatic disease, hospitalization or death. The risk of an individual being infected during a community event in a public place depends on the number of

infectious people in that community at any particular time point and the number of physical, fomite-mediated and near contacts one makes during that process. To the extent that polling places are crowded, require people to wait in lines, involve interacting with polling staff or other voters at a close distance, move people through the process slowly, are poorly ventilated and/or involve people touching objects like pens, paper, or surfaces within the voting booth, they constitute a risk to voters. Similarly, if voters or poll workers use toilets that are also used by others, they can be put at risk. The data supporting some aerosol transmission of Covid-19 provides evidence that poorly ventilated areas where crowding may take place pose risk to those using these facilities. The probability that a person who is exposed to Covid-19 in this setting will go on to develop severe Covid-19 disease or to die depends on the age of that person and his/her underlying health status. Given the relatively high prevalence of relevant co-morbidities (obesity, hypertension, diabetes), the proportion of the population over 60, and the fact that older people are more likely to vote than younger people (on a nationwide basis, 66 percent of over 65 years compared to 35.6 percent of 18-29 years in the 2018 national mid-term elections [54]), there is a substantial risk that an infection with Covid-19 in North Carolina could result in symptomatic disease, hospitalization or death.

33. ***I was asked to address the likelihood of a persistent or increased risk of transmission of Covid-19 in the fall in the weeks/months leading up to November 3, 2020.***

Epidemiologists have projected a number of future Covid-19 epidemic trajectories based on a range of different possible scenarios but all of these scenarios are similar in that they

predict that it is highly likely that Covid-19 will continue to circulate at its current level or at an even higher level than currently in October and November of 2020. The likelihood of continued transmission of Covid-19 in the fall 2020 can be estimated by modeling the epidemic process. Mathematical models simulate epidemics under a variety of scenarios using “parameters” obtained from empirical (data-driven) studies. Typically, a model uses estimates of the relative transmissibility of an infectious agent, the average number of contacts people in different age groups make and the duration of infectiousness of the virus to reproduce the epidemic trajectory that has been observed. Then modelers introduce assumptions about the impact of interventions, for example, the number of social contacts that occur when social distancing measures are in place and re-run the model with these hypothetical parameters to determine what effect these changes will have. Over the past several months, multiple modeling teams have developed these kinds of models, and while they often obtain different results depending on various differences in the assumptions made, all show that reducing the number of social contacts, especially in the presence of asymptomatic infection, will “flatten” or reduce the epidemic curve. For example, one such model, reported in *Emerging Infectious Diseases* this week, investigated the effectiveness of social distancing interventions in a mid-sized city. Modeled interventions included reducing the number of contacts made by adults greater than 60 years of age, adults 20–59 years of age, and children under 19 years of age for six weeks. The modelers found that these interventions delay or flatten the epidemic curve and that even modest reductions of

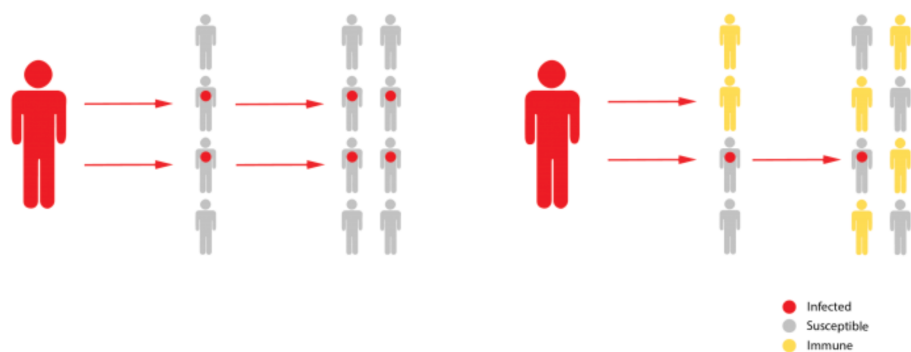
contacts could reduce the number of new cases and deaths by 20 percent. Notably, however, when interventions ended, the epidemic rebounded [53].

34. The expected future trajectory of Covid-19 depends on a number of factors including the level of “herd immunity” that has already been achieved by the circulating of the infection, the extent of social mixing that occurs, and the possibility that SARS-CoV-2 will be more transmissible in cooler, drier weather.

35. First, herd immunity is achieved when enough people in a population have been infected and developed immunity so that the likelihood that an infectious person will come into contact with a susceptible person is low. This concept is illustrated in the graphic below. When an infectious person encounters only susceptible people, he or she can infect all of them but when most of the people an infectious person encounters are immune, relatively few people will be infected by that infectious case.

Table 4 Herd Immunity (From

<https://www.technologyreview.com/2020/03/17/905244/what-is-herd-immunity-and-can-it-stop-the-coronavirus/>)



In a simple model of an outbreak, each case infects two more, creating an exponential increase in disease. But once half the population is immune, an outbreak no longer grows in size.

36. A general rule of thumb is that herd immunity can only be achieved when the proportion of people in a population who are immune is equal to $1 - (1/R_0)$, where R_0

refers to the basic reproductive number of an infectious disease. This term is defined as the number of people who, on average, will be infected by a single infectious person in an entirely susceptible population. The basic reproductive number of SARS-CoV-2 is estimated between two and three, with an average of about 2.6. This means that about 60 percent of the population would need to be immune before we see Covid-19 cases level out (in the absence of interventions such as social distancing). At present, it is unclear what proportion of the US population is seropositive (in other words, has evidence of an immune response to the infection), but no study conducted in the US to date has suggested that more than 20-30 percent of any specific community is immune and most studies suggest that the number is closer to 2-3 percent. A recent study from Spain, one of the countries that has been most affected by the epidemic, found that only 2 percent of the population was immune [30]. Therefore, it is highly unlikely that, short of a catastrophic increase in circulating virus, herd immunity will be achieved by November 2020. Furthermore, the lack of herd immunity is in part due to social distancing that has taken place to date and this means that as a population, we remain highly vulnerable to epidemic spread.

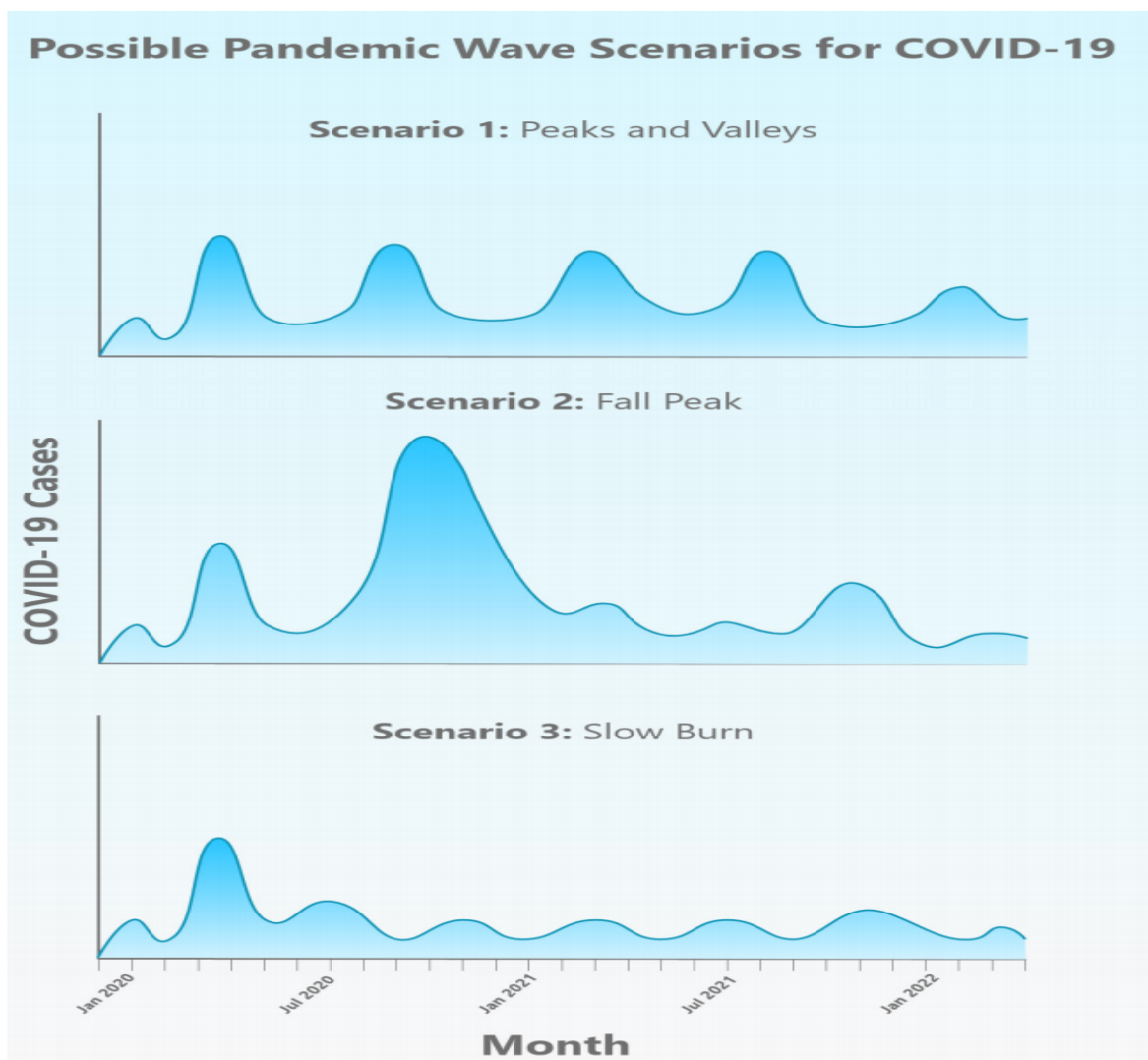
37. Secondly, it is highly likely that with the relaxation of social distancing measures and the end of “lock-down” the number of social contacts that people make will increase and that, therefore, the incidence of infection will increase accordingly. There is a linear relationship between the average number of social contacts individuals make and the reproductive number of the infection; as social contacts increase, the incidence of infection will increase proportionately.

38. Third, epidemic spread in the fall and winter could be driven by potential worsening of the epidemic due to changes in temperature or humidity that may be associated with higher viral stability with cooler and drier conditions, seasonal changes in host immunity and/or changes in human behavior (e.g., spending more time indoors). In the fall and winter, the outdoor air is colder, and the air is drier both indoors and out. For influenza, laboratory experiments have shown that absolute humidity — the amount of water vapor in the air — strongly affects viral transmission, with drier conditions being more favorable [31]. Lab studies on SAR-CoV-1 have also confirmed that viruses are stable for longer periods in cooler, drier environments [32]. However, multiple recent studies have suggested that SARS-CoV-2 transmission is possible in many different climates [33, 34].

39. Seasonal differences in transmission are also affected by differences in the ways people congregate in different seasons. In the fall and winter, people tend to spend more time indoors with less ventilation and less personal space than they do in the summer. Schools have been identified as the sites of much transmission of respiratory viruses including those that cause measles, chicken pox and influenza. [35, 36]. However, to date, the role of children in the transmission of SARS-CoV-2 is not clear and the relevance of the timing of school openings is not known. Finally, it is likely that host immunity is affected by seasonal changes. One hypothesis has focused on melatonin which has some immune effects and is modulated by the photoperiod [37], which varies seasonally. Vitamin D levels have also been associated with improved human immune responses -

these levels depend in part on ultraviolet light exposure which is higher in summer. There is strong evidence for the possible role of vitamin D supplementation in reducing the incidence of acute respiratory infection, as documented in a meta-analysis of randomized trials [38]. To summarize the evidence for seasonal trends in SARS-CoV-2, it is reasonable to expect that, like other beta-coronaviruses (a family of viruses with shared genetic characteristics), it may transmit somewhat more efficiently in fall and winter than summer.

Table 5 Possible Covid-19 scenarios [38]



40. These considerations have guided most of the modeling projections on the expected future trajectory of SARS-CoV-2 spread. The Center for Infectious Disease Research and Policy (CIDRAP) recently published a document where they drew lessons from previous influenza pandemics to predict the future trajectory of Covid-19 [39]. They summarize three different possible scenarios as illustrated in the above figure. In the first scenario, the first spring wave of Covid-19 that is currently underway will be followed by a series of repetitive smaller waves that occur through the summer and then consistently over a one- to two-year period, gradually diminishing sometime in 2021. These waves would be expected to vary geographically depending on what interventions are in place and how and when they are relaxed. Depending on the height of the peaks, this could lead to periodic re-implementation and interruption of social distancing measures over the next one to two years.

41. In the second and most likely scenario, the current first wave of Covid-19 will be followed by a larger wave in the fall or winter of 2020 and one or more smaller subsequent waves in 2021.

42. This pattern is what was seen with the 1918-19 influenza pandemic in which a small wave began in March 1918 but transmission leveled off during the summer months. This was followed by a much larger peak which occurred in the fall of 1918 and a third peak which occurred during the winter and spring of 1919. The 1957-58 and 2009-2010 influenza pandemics followed a similar pattern, with a smaller spring wave followed by a much larger fall wave [40]. Given the many similarities between how SARS-CoV-2 and

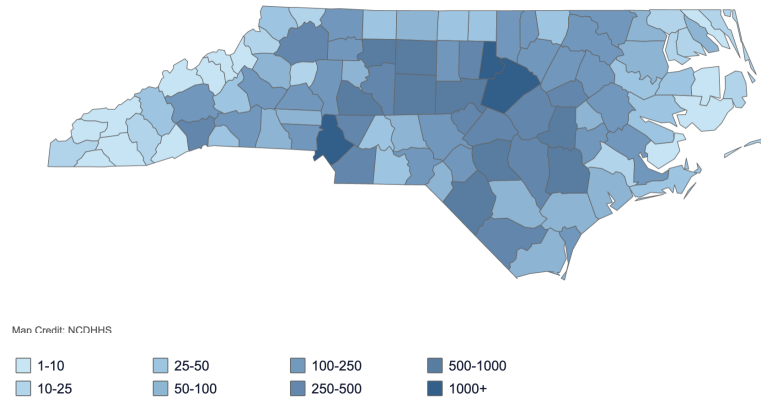
influenza are spread, it is expected that Covid-19 will behave in a similar way, and most epidemiologists expect that incidence will increase in the fall and winter months of 2020-2021.

43. In the third scenario proposed by the CIDRAP team, the first wave of Covid-19 in spring 2020 would be followed by persistent ongoing transmission and disease incidence without a clear wave pattern. This third scenario might not lead to the reinstitution of mitigation measures, although cases and deaths will continue to occur especially in areas where risk factors for disease and death are common.

44. Whichever scenario the pandemic follows, it is highly likely that Covid-19 activity will continue for at least another 18 to 24 months, with hot spots arising periodically in diverse geographic areas. In the period prior to the widespread use of an effective vaccine, this spread will continue to lead to serious disease and death in at-risk groups. As the pandemic wanes, it is likely that SARS-CoV-2 will continue to circulate at lower levels in the human population and will synchronize to a seasonal pattern with diminished severity over time, as other coronaviruses, such as the beta-coronaviruses OC43 and HKU1, [41] and past pandemic influenza viruses have done.

45. *I was asked to describe the Covid-19 situation in North Carolina.*

Table 6 County-specific Covid-19 prevalence for North Carolina by May 21, 2020. (from <https://covid19.ncdhhs.gov/>)

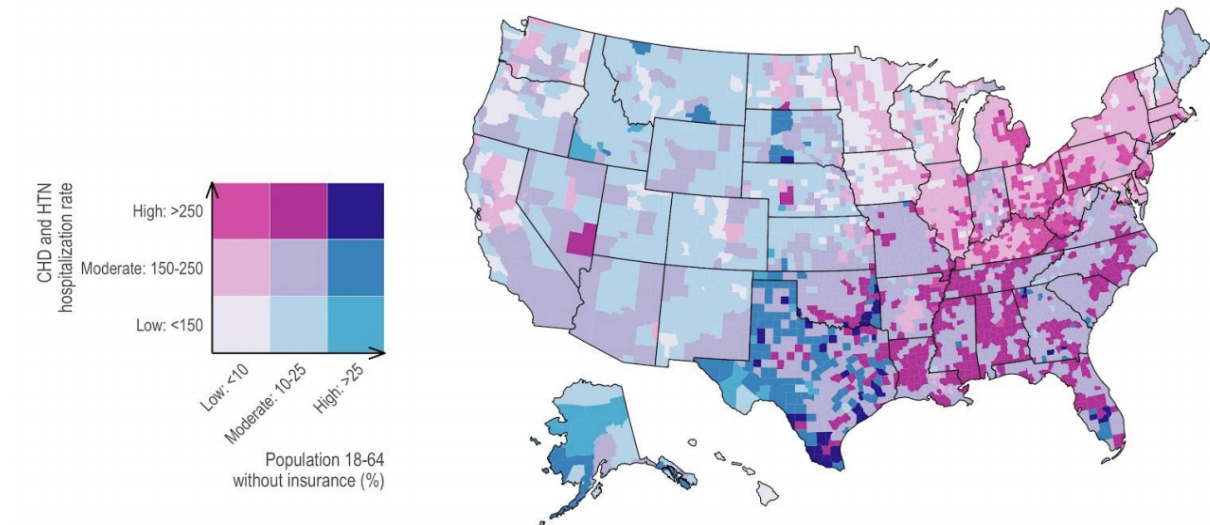


46. To assess the risk of serious disease given a Covid-19 infection, we can turn to the existing data on the prevalence of specific risk factors in the state. The CDC has documented that 33 percent of North Carolinians are obese and an additional 35 percent are overweight; 35 percent have a diagnosis of high blood pressure and 13.1 percent have diagnosed diabetes mellitus [45, 46, 47]. 16.3 percent of the state's population is 65 years old or over [48]. It is useful to compare the prevalence of different co-morbidities associated with poor outcomes in North Carolina to other states. The figures below give county-level rates of hospitalizations for coronary heart disease and hypertension demonstrating that North Carolina has comparatively high rates of these diseases and the age distribution of the population.

47. It is useful to compare the prevalence of different co-morbidities associated with poor outcomes in North Carolina to other states. The figures below give county-level rates of hospitalizations for coronary heart disease and hypertension demonstrating that

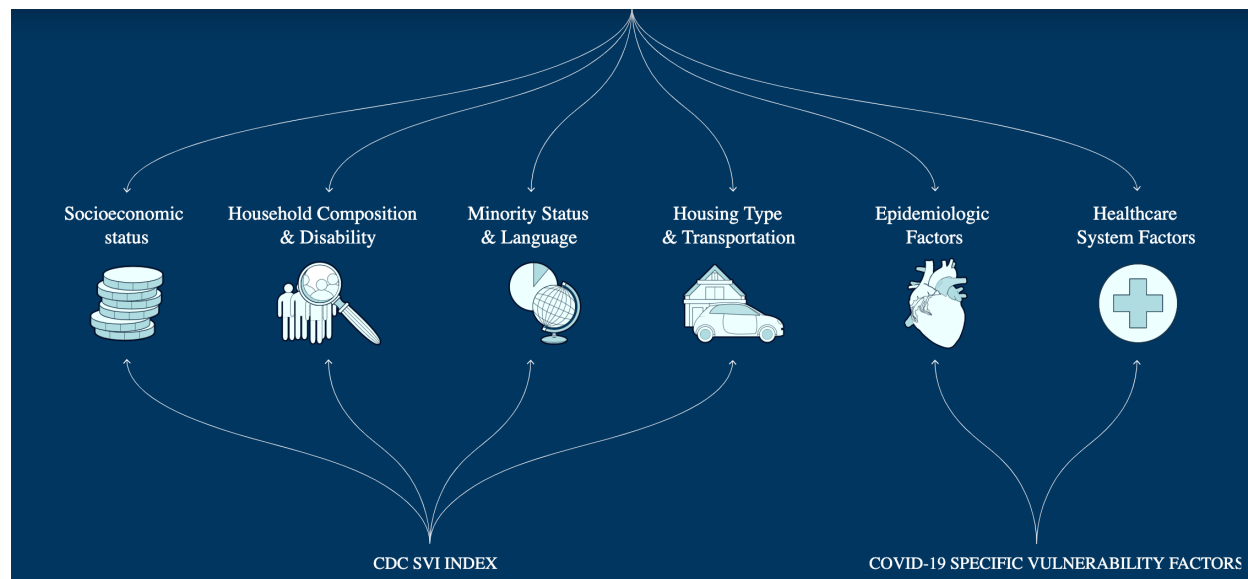
North Carolina has comparatively high rates of these diseases and the age distribution of the population.

Table 7. Rates of hypertension and Coronary Heart Disease Nationally. From (<https://www.medrxiv.org/content/10.1101/2020.04.08.20058248v1>)



48. The Kaiser Family Foundation has developed a method to estimate the proportion of a state's population at elevated risk for serious Covid-19 illness [49]. Using data from the CDC's 2018 Behavioral Risk Factor Surveillance System (BRFSS), they estimated the total number of at-risk adults by state—based on the revised definition from the CDC—of adults who are at higher risk of serious illness if they get infected with coronavirus. The relevant factors include ages 65 or older, heart disease, chronic obstructive pulmonary disease (COPD), uncontrolled asthma, diabetes, or a BMI greater than 40. Based on this analysis, 39% of adults over age 18 in North Carolina are at risk for serious disease with older adults making up 54.2% of those at high risk.

Table 8 CCVI Score components [48]



49. In another nation-wide assessment of risk, the Surgo Foundation has developed a Covid-19 community vulnerability index (the CCVI) to identify communities at especially high risk of being affected by Covid-19 [50]. The CCVI combines indicators specific to Covid-19 with the CDC's social vulnerability index, which measures the expected negative impact of any type of disaster. The indicators are based on the themes listed below.

50. On this scale, North Carolina scored a 98 out of 100 with 100 being the most vulnerable. It ranked second among the states on this measure, mostly because its high (poor) score in the area of healthcare system factors. These data suggest that in the event of further spread of Covid-19, North Carolina may experience higher levels of disease, disability and death than other states experiencing the same amount of transmission.

51. *I was asked if herd immunity, progress in vaccine development or the development of drugs to treat Covid-19 will alter the expected course of the Covid-19*

pandemic in the United States and specifically North Carolina. To date, the proportion of the population that is likely to be immune is far less than that that required to achieve herd immunity. This is unlikely to change significantly before November. Although recent studies of the temporal trajectories of the appearance of SARS-CoV-2 antibodies show that most people who are infected with the virus do develop an antibody-mediated immune response, it is not yet clear whether this response is adequate to protect people from future infection or for how long it might be protective. Other coronaviruses, such as those that cause colds, are known to provide protection for periods of approximately one year and this experience has led most Covid-19 experts to accept the “educated guess” that after being infected with SARS-CoV-2, most individuals will have an immune response which will offer some protection over the medium term — at least a year — and then its effectiveness might decline. Until there is empirical evidence of how well-protected previously infected people are in the future, there is no way to confirm or deny the existence of long-term immunity.

52. An effective vaccine is extremely unlikely to have been developed, tested and widely distributed before November. Vaccine development has proceeded at an unprecedented pace. More than 110 candidate vaccines are under development. A number of companies and research teams already have candidate vaccines that are either in human trials (eight have started) or close to ready to trial in humans. The most advanced of these seems to be the ChAdOx1 nCoV-19 vaccine being developed by a group in Oxford, England. The speed with which these vaccines are being developed is partly due to the fact

that a great deal of work was done on a SARS-CoV-1 vaccine after the 2002 epidemic and some of that work can be applied to this organism.

53. Despite this extraordinarily rapid progress, it is important to realize that the usual time frame from development to widespread use of a vaccine is over ten years. New vaccines require a complex set of trials to establish safety, immunogenicity, optimal dosing, etc. Phase 1 trials are usually conducted in small groups of healthy volunteers and are designed to establish whether serious adverse effects occur with escalating doses of the agent and whether the vaccine produces the expected immune response. Phase 2 trials are designed to replicate Phase 1 results in a more diverse population of volunteers, to assess whether the expected immune response is generated, and to test different vaccine schedules. Once safety, immunogenicity and optimal dosing are established, Phase 3 studies are conducted to determine vaccine efficacy. Phase 3 studies are usually much larger than phase 1 or 2 studies and are conducted in people at risk for the infection in question. So the time frame of these trials depends on the actual incidence of infection and is expected to be shorter in regions with very high rates of disease. The completion of all three steps is required for a vaccine to be approved by the FDA. Once a vaccine is approved, it must then be manufactured at a scale that will provide adequate coverage for a large population.

54. The White House has recently announced an initiative, “Operation Warp Speed,” to expedite the development of a vaccine that will be available to the US population. Although many scientists question the timeline proposed by the project, the

goal is to speed up the development and production of a vaccine so that 100 million doses are available in November of 2020 and the remaining 200 million doses needed to vaccinate the US population are ready by early 2021. Thus, even in the most optimistic scenario, it is highly unlikely that a vaccine will have been distributed and had time to induce an immune response in a significant number of Americans by November 3, 2020.

55. Although new and repurposed drugs are being tested and some may be found to be helpful in treating severe Covid-19, this is unlikely to have a major impact on the transmission of the virus and the risk of severe disease or death by November 2020. A number of antiviral drugs are currently being developed and other existing drugs are being “repurposed” as potential therapies for Covid-19. The hope is that these drugs will reduce the rate of death and severe disease in people who are treated with them. As of mid-April, the FDA website had listed 72 active and 211 planned Covid-19 drug trials and almost 1000 drug-development proposals have been submitted to the agency. To date, only Remdesivir has been shown in a major, randomized control trial to reduce the duration of illness in Covid-19 patients. In that study, Remdesivir reduced the median time to recovery in hospitalized patients with advanced Covid-19 disease and lung involvement from 15 days for those who received placebo to 11 days for patients treated with Remdesivir [51]. The researchers also noted a survival benefit (which was not “statistically significant”) with the Remdesivir group experiencing an 8.0 percent mortality rate compared to 11.6 percent for the placebo group. This suggests that even with the approval of the drugs that have been

found to be effective in clinical trials, people with severe Covid-19 are at risk for death as well as the long-term effects of lung damage and other sequelae of infection detailed above.

I declare under penalty of perjury that the foregoing is true and correct.

Executed this 2nd day of June, 2020.

A handwritten signature in black ink, appearing to read "Megan Murray". The signature is fluid and cursive, with a long horizontal stroke at the end.

Megan Murray, MD, MPH, ScD

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51. Beigel JH, Tomashek KM, Dodd LE, et al. Remdesivir for the Treatment of Covid-19 - Preliminary Report [published online ahead of print, 2020 May 22]. *N Engl J Med*. 2020;10.1056/NEJMoa2007764. doi:10.1056/NEJMoa2007764
52. The airborne lifetime of small speech droplets and their potential importance in SARS-CoV-2 transmission. Valentyn Stadnytskyi, Christina E. Bax, Adriaan Bax, Philip Anfinrud. Proceedings of the National Academy of Sciences May 2020, 202006874; DOI: 10.1073/pnas.2006874117
53. Matrajt L, Leung T. Evaluating the effectiveness of social distancing interventions to delay or flatten the epidemic curve of coronavirus disease. *Emerg. Infect. Dis.* 2020 Aug. <https://doi.org/10.3201/eid2608.201093>
54. <https://www.census.gov/library/stories/2019/04/behind-2018-united-states-midterm-election-turnout.html>

**Harvard Medical School/Harvard School of Dental Medicine
Curriculum Vitae**

Date Prepared: May 2020

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Work Email: megan_murray@hms.harvard.edu

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Place of Birth: Minnesota

Education

1980	AB Magna cum laude	Philosophy	Dartmouth College, Dartmouth, NH
1990	MD	Medicine	Harvard Medical School, Boston, MA
1997	MPH	Public Health	Harvard School of Public Health, Boston, MA
2001	ScD	Epidemiology (James Robins)	Harvard School of Public Health, Boston, MA

Postdoctoral Training

1990-1991	Internship	Internal Medicine	Massachusetts General Hospital, Harvard Medical School, Boston, MA
1991-1993	Residency	Internal Medicine	Massachusetts General Hospital, Harvard Medical School, Boston, MA

1993-1997	Fellowship	Infectious Disease	Massachusetts General Hospital, Harvard Medical School, Boston, MA
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Faculty Academic Appointments

1997-2006	Instructor in Medicine	Medicine	Harvard Medical School
1999-2000	Research Associate	Epidemiology	Harvard School of Public Health
2001-2007	Assistant Professor	Epidemiology	Harvard School of Public Health
2004-	Associate		Broad Institute, Cambridge, MA
2006-2009	Assistant Professor	Medicine	Harvard Medical School
2007-2013	Associate Professor	Epidemiology	Harvard School of Public Health
2009-2012	Associate Professor	Medicine	Harvard Medical School
2012-	Professor	Global Health and Social Medicine	Harvard Medical School
2013-	Professor	Epidemiology	Harvard T.H. Chan School of Public Health
2017-	Ronda Stryker and William Johnston Professor of Global Health	Global Health and Social Medicine	Harvard Medical School

Appointments at Hospitals/Affiliated Institutions

01/98-09/02	Clinical Assistant in Medicine	Dept. of Internal Medicine	Massachusetts General Hospital
09/02-09/06	Assistant in Medicine	Dept. of Internal Medicine	Massachusetts General Hospital

09/06-02/08	Assistant Physician	Dept. of Internal Medicine	Massachusetts General Hospital
02/08-09/10	Consultant (Medicine Services)	Dept. of Internal Medicine	Massachusetts General Hospital

Other Professional Positions

Year	Position Title	Institution	Level of effort
1980-1984	Refugee Camp Coordinator	Intergovernmental Committee for Migration, Phanat Nikhom, Thailand	
1984	Public Health Educator	Matanyok Rural Training Project, Rift Valley, Kenya	
2004-	Research Director	Partners In Health, Boston	36 days per year

Major Administrative Leadership Positions

Local

2007-	Director of Research	Division of Global Health Equity, Brigham and Women's Hospital and Partners In Health, Boston, MA
2010-	Director	Research Core, Department of Global Health and Social Medicine, Harvard Medical School, Boston, MA
2012-2013	Member	Executive Leadership Team, Global Health Delivery Partnership, Harvard Medical School, Brigham and Women's Hospital and Partners In Health, Boston, MA

Committee Service

Local

1986-1990	Curriculum Committee	Harvard Medical School Member
2001-	Infectious Disease-Epidemiology Graduate Admissions Committee	Harvard School of Public Health Member
2003-2005	Faculty Council	Harvard School of Public Health Member
2004-	Steering Committee for the Residency in Global Health	Brigham and Women's Hospital Member
2005-	Human Subjects Committee	Harvard School of Public Health Member
2005	Task Force on Women in Sciences and Engineering	Harvard University, Cambridge, MA Member

2006	President's Task Force on Avian Influenza	Harvard University Member
2006	Search Committee for Dean of Educational Programs	Harvard School of Public Health Member
2007	Epidemiology Curriculum Committee	Harvard School of Public Health Member
2007	Search Committee for Compliance Officer	Harvard School of Public Health Member
2007	Search Committee for Assistant Professor in the Division of Social Medicine and Health Inequalities	Brigham and Women's Hospital Member
2008	Search Committee for Assistant Professor in Infectious Disease Epidemiology	Harvard School of Public Health Member
2009	Search Committee for Assistant Professor in Infectious Disease Epidemiology	Harvard School of Public Health Chair
2010	Global Health Epidemiology Committee	Harvard School of Public Health Member
2010-2011	Strategic Leadership Team	Brigham and Women's Hospital Member (Co-Chair Community Engagement Mission Area)
2012	Ad Hoc Committee to Evaluate Professorial Candidate	Harvard Medical School Member
2012-2016	Professor of Population Medicine Search Committee	Harvard Pilgrim Health Care Institute Member
2012	Ad Hoc Evaluation of Professorial Appointment Committee	Harvard Medical School Member
2012	Global Health Instructor Search Committee	Harvard Medical School Co-chair
2014-2016	Pershing Square Professorship in Global Health Search Committee	Harvard Medical School Chair
2015	Search Committee for Professor of Biomedical Informatics	Harvard Medical School Member

2016-	Department of Biomedical Informatics Executive Committee	Harvard Medical School Member
2016-	Committee on Promotions, Reappointments, and Appointments (P&R)	Harvard Medical School Member
2018-2019	Dean's Innovation Grants Review Committee	Harvard Medical School Member
2018-2019	Therapeutics Planning Foundry Committee	Harvard Medical School Member
2019-	Center for Computational Biomedicine (CCB) Advisory Committee	Harvard Medical School Member
2019-	Faculty Council	Harvard Medical School/Harvard School of Dental Medicine Member
2020-	Ariadne Spark Grant Review Committee	Harvard Medical School Member
2020-	Massachusetts Consortium on Pathogen Readiness (MassCPR) Working Group on Epidemiology	Harvard Medical School Co-Lead
National and International		
2005-2007	Committee on Infectious Diseases among Gulf War Veterans	Institute of Medicine, Washington, DC Member
2006-2010	IHR Roster of Experts in Modeling Analytical Epidemiology	World Health Organization, Geneva, Switzerland
2007-2009	Global Task on XDR Tuberculosis	World Health Organization
2007	External Review Committee for TB Program	Montreal Chest Institute, McGill University Montreal, Canada Member
2008-2011	STAG (Strategic and technical advisory group) TB	World Health Organization Member

2008	39 th Union World Conference 2008 Drug Resistance /MDR-TB management II	International Union TB and Lung Disease Paris, France, Coordinator
2009	Panel to Review the DST/NRF Centre of Excellence for Biomedical TB Research	National Research Foundation, Pretoria, South Africa, Convener
2009-2010	Expert Panel on Tuberculosis and Diabetes	Union of TB and Lung Disease and World Diabetes Federation Member
2010-2015	Advisory Group to Fogarty Grant	Member Public Health Research Institute New Jersey
2010-	Working Group on New Diagnostics	Member, Stop TB Partnership Geneva, Switzerland
2013-2014	Millennium Villages Project Independent Expert Group Meetings	Member Earth Institute, Columbia University Millennium Development Goals Centre West and Central Africa Dakar, Senegal
2013-2014	External Advisory Committee on Tuberculosis	Member Gates Foundation New York City, NY
2016-	Critical Path to TB Drug Regimens (CPTR) Initiative	Member

Professional Societies

1995-	Infectious Disease Society of America	Member
1997-	Society for Epidemiologic Research	Member
2007-	International Union of TB and Lung Disease	Member
2007-	Global Health Council	Member
2009-	American Society for Tropical Medicine	Member

Grant Review Activities

2004	Fogarty International Center/NIH Study Section ZRG1 ICP-3(03)	NIH, Bethesda, MD Member
2005	Improving Tuberculosis Control in Africa; Mathematical Modeling of Intervention Trials	Wellcome Trust Review London, England Member
2008	Postdoctoral Program Review for Indonesian PhDs	Royal Netherlands Academy of Arts and Sciences (KNAW), Amsterdam, Holland Referee
2008	Center for AIDS Research Scholar and Feasibility Scientific Reviewer Committee	Harvard School of Public Health Member
2009, 2010	Center for Scientific Review/NIH study section I ZRG1 IDM-P 50 R	NIH Ad hoc Member
2009-2016	Center for Scientific Review/NIH Study Section on Clinical Research and Field Studies of Infectious Diseases (CRFS)	NIH Permanent Member
2009	Wellcome Trust London, England	Ad hoc Reviewer
2010	National Science Foundation South Africa	Ad hoc Reviewer
2012	Center for Scientific Review/NIH Study Section ZRG1 AARR-K (52)	NIH Ad-hoc Member
2015	Center for Scientific Review/NIH Study Section ZRG1 IMST-K (50)S	NIH Ad-hoc Member
2017	Center for Scientific Review/NIH Study Section ZAI1 LG-M (M1) NIAID Clinical Trial Implementation Cooperative Agreement (U01/R01)	NIH Ad-hoc Member
2018	Center for Scientific Review/NIH Clinical Research and Field Studies of Infectious Diseases [CRFS] Study Section ZRG1 IDM-R (02)	NIH Ad-hoc Member

2019

Center for Scientific Review/NIH Study
Section ZRG1 IDM-R (50)

NIH
Ad-hoc Member

Editorial Activities

Ad hoc Reviewer

Science
Nature Medicine
New England Journal Medicine
Lancet
Lancet Infectious Diseases
Lancet Pulmonary Medicine
Epidemiology
American Journal of Epidemiology
International Journal of Tuberculosis and Lung Diseases
British Medical Journal
British Medical Journal, Global Health
Emerging Infectious Diseases
PLOS Medicine
PLOS Pathogens
PLOS One
Scandinavian Journal of Infectious Disease
Journal of the American Medical Association
American Journal Respiratory and Critical Care Medicine
Journal of Clinical Microbiology
Antimicrobial Agents and Chemotherapy
PNAS (Proceedings of the National Academy of Sciences)
Bulletin of the World Health Organization
Clinical Infectious Disease
Journal Infectious Disease
Annals of Internal Medicine
American Journal of Tropical Medicine and Hygiene
Royal Society Proceedings B
BMC Medicine
BMC Genomics
BMC Public Health
BMC Biology
BMC Health Services
Interface
Epidemics
Royal Society Open Science

mBio

Other Editorial Roles

2004-	Member of Editorial Board	European Journal of Epidemiology
2005-2012	Associate Editor	International Journal of TB and Lung Disease
2009-	Associate Editor	PLOS Medicine

Honors and Prizes

1980	Dartmouth General Fellowship	Dartmouth College
1990	Aesculapian Society	Harvard Medical School
1990	Paul Dudley White Fellowship	Harvard Medical School
1996	Howard Hughes Post-Doctoral Research Fellowship	Howard Hughes Medical Institute
1997	Tapplin Fellowship Award	Harvard School of Public Health
2001	Teaching Award	School of Public Health, Boston University
2002	Teaching Award	Harvard School of Public Health
2004	Ellison Senior Scholar	Ellison Medical Foundation
2008	Recognition Award	Harvard School of Public Health
2010	Nominated for Mentorship Award	Harvard Medical School
2010-11	Landolt Chair	Ecole Polytechnique Federale de Lausanne

Report of Funded and Unfunded Projects

Funding Information

Past

- 1997-2003 Molecular epidemiology of tuberculosis
NIH/NIAID 1K08AI001430-01
PI
This study explored the use of molecular epidemiologic data for epidemiologic inference and evolutionary studies of *M. tuberculosis*.
- 2000-2003 Population-based investigations of tuberculosis
NIH R01AI046669
Co-investigator
In this project, population-based genetic studies of human specimens were used to determine the clinical consequences of mutations in genes associated with bacterial antibiotic resistance and virulence.
- 2002-2005 Transmissibility and fitness of drug-resistant TB, Sverdlovsk
WHO T9-181-270
PI
This project assessed epidemiologic risk factors for TB drug resistance, identified locally prevalent drug-resistance profiles, used molecular epidemiological analyses to measure association between clustering and specific drug-resistance mutations, and assessed demographic distribution of drug resistance in prison and local community, evaluating extent of transmission between the two groups.
- 2003-2005 INH resistance in Beijing/W Isolates of *M. tuberculosis*
NIH R21 AI055800
Co-investigator
This project sought to identify risk factors associated with Isoniazid resistance which may be pathogen and/or host- specific and which may lead to acquisition of MDR-TB, after controlling for compliance.
- 2003-2005 Decision analysis for TB control
Bill Melinda Gates Foundation
Co-investigator
This project developed a decision-analytic model that could be used with data from different countries to assess the potential benefits, costs, and cost-effectiveness of the full range of policy options for dealing with MDR-TB, including preventive therapy, active case finding, diagnostic testing and treatment.
- 2004-2009 Curriculum in Emerging Infectious Diseases
NIH/NIGMS K073000-04
PI (\$363,933)

This project aimed to develop and implement a core course in transmission dynamics of emerging infectious diseases, taking an interdisciplinary approach that incorporates case-based seminars and short courses.

- 2005-2007 Evaluation of a community based HIV-TB adherence support program in a government ARV-rollout site in KwaZulu-Natal, South Africa
Harvard University Center for AIDS Research
Co-investigator
This study evaluated the feasibility of community-based adherence support program designed to improve HIV/AIDS and TB outcomes among a cohort of HIV patients in a government ARV treatment program.
- 2006-2007 Ferroportin Polymorphisms and Tuberculosis Susceptibility
William F. Milton Fund/Harvard Medical School
PI
This study assessed the association between Ferroportin (FPN1) mutations, iron intake and TB susceptibility in South Africa.
- 2006-2010 Macrophage Iron Metabolism and Tuberculosis Infection
NIH/NIAID R21 AI068077-01
PI (\$271,375)
We elucidated the role of host macrophage iron status on the growth of *M. tuberculosis* and explored the impact of iron and ferroportin status on cellular immune function.
- 2006-2011 Epidemiology of Multidrug-Resistant Tuberculosis in Peru
NIH/NIAID R01 A1057786-01A2
Co-investigator
The goal of this project is to provide new knowledge about the transmission dynamics of multidrug-resistant tuberculosis in a high TB-burden area in Peru and will measure within-household transmission of various strains of TB, assess the impact of socio-demographic and clinical confounders and risk modifiers, and measure associations between specific resistance mutations and phenotypes.
- 2007-2009 A Postmortem Study of the Burden of MDR and XDR Tuberculosis Among Adult Inpatient in KZN Deaths Occurring at Edendale Hospital Kwazulu-Natal South Africa
Massachusetts General Hospital
PI (\$60,050)
This study estimated the burden of tuberculosis among seriously ill individuals in KZN and measured the proportion of TB among these patients which is drug-resistant by conducting postmortem tests at Edendale Hospital KZN.
- 2007-2014 Epidemiology and Transmission Dynamics of MDR/XDR Tuberculosis
NIH/NIAID U19 A1076217
PI (\$13,422,751)
We conducted a series of linked interdisciplinary research projects focused on the emergence and transmission of multidrug and extensively drug resistant TB: a cohort

study of host and microbial factors associated with MDR and XDR TB in Lima, Peru; a study characterizing *M. tuberculosis* strain diversity and its contribution to the emergence and spread of MDR; and a study using epidemic and individual predictive models to support public health policy and clinical decision-making for MDR and XDR TB.

- 2009 Systematic Reviews of Diabetes and Tuberculosis Interactions
PI (\$25,000)
International Union of TB and Lung Disease
We evaluated the links between TB and diabetes by conducting a series of systematic reviews and meta-analyses.
- 2009-2012 Bioaerosols Production and Influenza Study
Pulmatrix Inc.
PI (\$348,393)
The project measured the particle production in persons diagnosed with active influenza, measured the quantity and size distribution of influenza virus particles generated and exhaled by persons infected with influenza during normal tidal breathing, and measured the secondary attack rate of influenza within their households.
- 2009-2013 Treat TB: Technology, Research, Education and Technical Assistance for TB
USAID (subcontract through International Union against TB and Lung Disease)
Co-investigator
The subproject aims were to develop a modeling tool to assist national policy-makers in selecting the appropriate tests and strategies for the diagnosis of tuberculosis in specific types of epidemiological settings, with an emphasis on low- and middle-income countries, taking into account a variety of modifying factors including drug resistance and HIV.
- 2009-2014 Strengthening and Studying Community Based Integrated Primary Health Care Systems in Rural Rwanda
Doris Duke Foundation
Co-investigator
The PHIT Partnership strengthened integrated primary health care delivery in Rwanda. The Partnership deployed a care-based intervention, conduct implementation research to generate data for ongoing monitoring, evaluation, and quality improvement of the intervention.
- 2009-2014 MIDAS Center for Communicable Disease Dynamics
NIH/NIGMS U54 GM088558-01
Co-investigator
This project advanced the quantitative study of communicable diseases through training/education, transdisciplinary research, and public health policy and will develop statistical and novel modeling methods, train mathematical modelers, perform outreach, and develop software for the analysis of communicable disease data.
- 2012-2013 Identification of GyrA/B Mutations that Predict Fluoroquinolone Resistant TB

Harvard University Center for AIDS Research

Co-investigator

This project evaluated the correlation between newly-developed molecular genetic probes that can detect mutations in the *gryA* and *gryB* genes of tuberculosis which may render them more resistant to first and later generation quinolones.

- 2013-2014 African Health Facility Capacity to Roll Out Technological Interventions
Gates Foundation
PI (\$17,232)
This project summarized the following outcomes across Rwanda health facilities: the percent and number of health facilities with electricity currently; estimate percent of health clinics with electricity within five years; percent and number of facilities with rapid HIV testing available; and the distribution of HIV testing staffing.

Current

- 2014-2020 Integrated discovery and development of innovative TB Diagnostics
NIH/NIAID CETR U19AI109755
PI (\$29,218,333)
This multi-disciplinary collaboration is designed to enable the discovery of new biomarkers of *Mycobacterium tuberculosis* drug resistance, identify optimal clinical sampling strategies directed toward detection of *Mtb* DNA and develop and test a sensitive micro-array based rapid diagnostic. Our long-term goal is to develop a diagnostic strategy that will improve the diagnosis of childhood and DR TB and stem the further spread of the disease. This grant is in a no cost extension phase.
- 2015-2022 Metabolic Factors that Control the Spectrum of Human Tuberculosis
NIH/NIAID TBRU U19AI111224
Co-PI (\$19,815,180)
This consortium project focuses on the link between host immune and metabolic factors and their impact on progression and persistence of tuberculosis. Teams focusing on human subjects, bio-informatics, and metabolomics work in parallel to identify targets including pathways linking human metabolism and immune response, T cells involved in *Mtb* response, pathogen determinants of drug resistance and pathogen-shed markers of clinical TB phenotypes. Each project includes validation of these targets in the guinea pig model.
- 2018- Metabolic Factors that Control the Spectrum of Human Tuberculosis
NIH/NIAID TBRU U19AI111224-04 Supplement
Co-PI (\$200,000)
This supplement to the TBRU consortium project is a new collaborative, multi-disciplinary effort that conducted a genome-to-genome approach aimed at the identification of

interacting molecular patterns in *Mtb* and the human host. The same approach and new methods will be adaptable and easily applicable to other populations being studied within the TBRU program.

- 2019-2024 Bacterial Determinants of Treatment Response in Mycobacteria Tuberculosis
NIH/NIAID U19AI142793-01
PI (\$14,633,712)
This study will focus on the discovery of the genetic determinants of drug tolerance and resistance in mycobacteria tuberculosis both through mechanistic bench studies and through a genome wide association study of treatment failure in TB patients.
- 2019-2021 Randomised trial of an intervention to increase tuberculosis notifications by private practitioners in Indonesia, plus sequencing and susceptibility sub studies
CRDF Global u/d USDA (59-0210-06-004) DAA3-19-64909-2
United States Research Leader (\$99,917)
This study will evaluate whether a tailored intervention package increases notifications of tuberculosis (TB) by private practitioners in Bandung, Indonesia.
- 2020-2023 Are TB neighbourhoods a high risk population for active intervention?
CRDF Global u/d NIAID
United States Research Leader (\$99,999)
This study will confirm whether neighborhoods around known, routinely diagnosed TB index cases are high risk sub-populations which may warrant active intervention to enhance TB control.

Unfunded Projects

- 2003 Transmission dynamics of SARS (Co-leader)
I co-led a team that developed a mathematical model of the transmission dynamics of SARS. (Lipsitch et al. Science 2003)
- 2005-2011 TB Genome Project (Collaborator)
Whole genome sequencing of sets of drug resistant *M. tuberculosis* isolates.
I led a collaboration with the Broad Institute to identify, sequence and analyze progressively resistant isolates of *M. tuberculosis* to identify drug resistance mutations and to characterize compensatory or enabling mutations. We currently have one manuscript under review and several in preparation.
- 2006 Cost-effectiveness of testing the blood supply for West Nile Virus (Supervisor)
I supervised a doctoral student in the development of a combined transmission/cost-effectiveness model on West Nile Virus. (Korves et al. PLoS Med 2006; Korves et al. Clin Infect Dis 2006)

- 2006-2010 Determinants of tuberculosis (Advisor)
I supervised two doctoral students to carry out epidemiologic studies and meta-analyses of the associations between determinants (smoking and diabetes mellitus) and tuberculosis and to use the parameters thus obtained to construct mathematical models assessing the impact interventions directed at these determinants. (Jeon et al. PLoS Med 2008; Jeon et al, Trop Med and Int Health 2010; Lin et al. Lancet 2008; Lin et al. Am J Respir Crit Care Med 2009, Murray M et al, IJTLD 2010, Baker M et al. BMC Medicine 2011, Lin et al. IJTLD 2011). I supervised Dr. Olivia Oxlade on work that is a further extension of this project.
- 2007-2009 Timing of ART in patients co-infected with HIV and TB in Rwanda: an observational approach (Initiator)
I initiated this project and supervised a doctoral student in the collection and analysis of the data. This work led to a paper published in PLoS Medicine (Franke M et al. PLoS Med 2011).
- 2007-2009 Metabolic modeling of *M. tuberculosis* (Collaborator)
I collaborated with a team of bio-informaticists on a project to fit a metabolic flux model to *M. tuberculosis* expression data to mycolic acid production. (Colijn et al. PLoS Computational Biology, 2009)
- 2008-2009 Structural analysis of *M. tuberculosis* “resistome” (Collaborator)
I collaborated with George Church on a project to define the structural basis of drug resistance in *M. tuberculosis* using sequence data. We published one paper together (Sandgren et al. PLoS Med 2009).
- 2008-2010 *M. tuberculosis* isoniazid and quinolone mono-resistance in South Africa (Mentor)
I supervised two trainees who are investigating the frequency and outcomes of mono-resistance in *M. tuberculosis* in South Africa. We published two papers in this area. (Jeon C et al, 2010, Jacobson K et al, 2011).
- 2008-2010 ART Outcomes in Rwanda for 1000 HIV patients (Co-investigator)
I provided technical support and supervised the data collection and analysis team. We have published a paper on this topic (Rich et al, 2011).
- 2009-2010 Within host dynamics of TB and the evolution of drug resistance. (Initiator)
I collaborated with my former trainees, Ted Cohen and Caroline Colijn, on a project to model the within-host evolution of drug resistance (Colijn C et al, PLoS One, 2011).
- 2009-2011 Sex trafficking and HIV transmission in India (Advisor)
I supervised a doctoral student in the analysis of data and construction of a mathematical model of HIV transmission among trafficked sex workers in India. We published several papers together.

- 2010-2012 Cholera transmission in the Democratic Republic of the Congo and Haiti. (Collaborator and Adviser). I worked with a team including hydraulologists and infectious disease modelers on the transmission routes by which cholera spreads. We published three papers (Rinaldo et al, Proc Natl Acad Sci, 2012; Bompangue et al, PLoS Curr 2012; Bompangue et al, Lancet, 2012).
- 2012- Poverty traps in under-resourced settings (Collaborator)
I collaborate with Matthew Bonds on a range of studies to understand the role of infectious diseases in creating poverty traps in Rwanda and other under-resourced settings.
- 2014-2015 MDR TB in India
I worked with a Fulbright fellow to assess the burden of MDR TB in India.
- 2013-2016 Ebola Diagnostics, Asymptomatic Infection and Modeling (Initiator and Collaborator)
I worked with the Partners in Health clinical teams in Sierra Leone to evaluate two point of care diagnostic tests and supervised Gene Richardson in a study of asymptomatic Ebola infections and Ibrahim Diakite on a study of dynamic modeling of Ebola vaccination strategies.
- 2012- Impact of Health Research Capacity Building (Team Leader)
I lead a team focused on the implementation and assessment of Health Research Capacity Building in Africa.
- 2014- Yaws epidemiology and impact of mass drug administration (Collaborator)
I work with my former student, Eric Mooring, on the evaluation of data collected during a mass drug administration campaign in Papua, New Guinea.
- 2014- Health System Strengthening in Madagascar (Collaborator)
I work on developing methods to evaluate the impact of health system strengthening in Madagascar and other implementation sites.
- 2018-2019 Investigation of Services delivered for TB by External care system – especially the Private sector (INSTEP) (Collaborator)
I worked on quantitative measure of health seeking pathways and delays, diagnostic and treatment behaviors of private providers and qualitative (or mixed methods) analysis of provider behaviors and the reasons behind them as assessed via direct interviews.

Training Grants and Mentored Trainee Grants

- 1990-2011 Multidisciplinary AIDS Training Grant
NIH NIAID T32AI007387
Mentor (PI: Martin Hirsch)

The major goal was to provide in depth laboratory experience in a specific research area of virology, immunology, molecular biology, oncology, epidemiology molecular genetics, or molecular therapeutics to selected postdoctoral candidates.

- 1992-2022 Program for AIDS Clinical Research Training (PACRT)
NIH NIAID T32 AI007433
Mentor (PI: Kenneth Freedberg)
The major goal is to provide training in quantitative research methodologies with a focus on HIV clinical research to pre-doctoral PhD students and physicians at formative stages in their careers.
- 1998-2020 Epidemiology of Infectious Diseases
NIH NIAID T32 AI007535
Mentor (PI: George Seage)
The major goal is to increase the number of graduates who will be capable of drawing on diverse tools – including sophisticated approaches to causal inference, transmission-dynamic modeling, model fitting, population genomics and phylogenetics – in a knowledgeable way to meet the infectious disease threats of a new generation.
- 2004-2009 Molecular Approaches for Understanding TB Dynamics
NIH NIAID K08 5K08AI055985
Co-Mentor to Ted Cohen
The major goal of this five-year training program K award focused on the development of new analytic tools to evaluate molecular data from tuberculosis patients.
- 2009 AMSTH Postdoctoral Fellowship in Tropical Infectious Diseases
Mentor to Karen Jacobson
The major goal was to fund to conduct research focused on infectious diseases of low and low-middle income countries.
- 2010-2013 Predicting the impact and cost-effectiveness of technical and non-technical approaches to TB control in low and middle income countries
CIHR (Canadian Institute for Health Research) Fellowship MFE106987
Mentor to Olivia Oxlade
The goal was to predict, in 3 low and middle income countries, the epidemiologic impact and cost effectiveness of a technical approach to TB control (using improved diagnostic tests for earlier diagnosis of active TB disease) versus a non-technical population level intervention designed to reduce tobacco use and alcohol consumption.
- 2010-2014 The Economic Impacts of Community-Based Integrated Health Care Systems in Rural Rwanda
NIH Fogarty K01 TW008773
Mentor to Matthew Bonds

The major goal of this K award was to measure the specific economic consequences of expanded community-based integrated primary healthcare in Rwanda by measuring the partial effects of malnutrition, disease, schooling and socioeconomic status on each other.

- 2011 Modifiable risk factors for tuberculosis disease in children
Parker B. Francis Fellowship in Pulmonary Research
Mentor to Molly Franke
The major goal was to identify modifiable risk factors for TB in children.
- 2011-2016 Geospatial Clustering and Molecular and Social Epidemiology of Drug Resistant TB
NIH Fogarty K01 5K01TW009213
Co-Mentor to Karen Jacobson
The major goal of this K award was to estimate the burden of drug resistant TB and assess the heterogeneity of disease burden in different geographic locations, to examine the association of host risk factors and population determinants with regions of high drug resistant TB burden, and to describe the spatial and molecular clustering of strains of drug resistant TB in this province. My role was to mentor Karen Jacobson in research in molecular and social epidemiology of TB.
- 2012-2013 US-Italy Fulbright Scholarship
Mentor to Anna Odone
- 2012-2016 The Role of Development Assistance for Health in Reducing Child Mortality
NIH NICHD 4K01HD071929-05
Epidemiology mentor to Chunling Lu
The major goal of this K award was to obtain background knowledge of epidemiology so as to understand the disease profiles of under-five children of different age groups in developing countries.
- 2013-2014 Controlling Drug Resistant Tuberculosis (TB): A Review of Literature and an Attempt for Designing Innovative Approaches in Indian Setting
Core Fulbright Visiting Scholar Research Grant
Mentor to Sachin Atre
- 2013-2015 Gene Mutations and Tuberculosis Resistance
American Lung Association Research Award
Mentor to Maha Farhat
The major goal was to investigate the genetic sequences of known and candidate resistant genes for a large panel of TB drugs, to determine which mutations predict the extent of resistance, and if specific combinations of mutations interact to affect this resistance level. The information will be used to guide the development of a much needed rapid diagnostic test for drug resistant TB.

- 2014 Genetic determinants of drug resistance in mycobacterium tuberculosis
Parker B. Francis Fellowship in Pulmonary Research
Mentor to Maha Farhat
The major goal was to investigate the genetic sequences of known and candidate resistance genes for a large panel of TB drugs to determine which mutations predict the extent of resistance and use this information to guide the development of improved diagnostic tests for resistance.
- 2014-2017 Integrating Pediatric Care Delivery in Rural Healthcare Systems
NIH NICHD 5DP5OD019894
Mentor (PI: Duncan Maru)
The major goal was to increase the timely engagement in acute care for children to receive evidence-based World Health Organization protocols aimed at reducing child mortality and to implement a Chronic Care Model for pediatric patients under the age of twenty suffering from a chronic disease.
- 2014-2019 Infectious Disease and Basic Microbiological Mechanisms
NIH NIAID T32 2T32AI007061
Mentor (PI: Marcia Goldberg)
The major goal is to train scientists who have a career goal of solving medically relevant problems and who elect rigorous laboratory or epidemiologic training in any of the Harvard adult infectious disease programs or other Harvard-based institutions participating in this program.
- 2015-2017 New Tools for the Interpretation of Pathogen Genomic Data with a Focus on Mycobacterium Tuberculosis
NIH Fogarty K01 5K01ES026835
Principal Mentor to Maha Farhat
The major goal of this K award was to develop a web-based public interface to several analysis tools, to develop and study an MTB gene-gene network, and to study the performance of methods in current use for the association of genotype and phenotype in pathogens, and develop a generalizable power calculator for the best performing method.
- 2016-2017 Genetic Determinants of Drug Resistance in Mycobacterium Tuberculosis
NIH URM Supplement U19AI109755-03S1
PI & Mentor to Ibrahim Diakite (Total direct costs \$82,633)
The major goal of this supplement was to develop and validate a prediction model that will define the optimal set of mutations to be assessed to improve the performance of rapid molecular diagnostics.

Report of Local Teaching and Training

Teaching of Students in Courses

Boston University

1998-2001	SPH EB755: Infectious Disease Epidemiology 34 students of public health	Boston University School of Public Health 2.5-hr sessions per week for 15 weeks
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Harvard School of Public Health

2001-2003	ID293: Inference in Infectious Disease Epidemiology 15 students of public health	Harvard School of Public Health 4-hr sessions per week for 8 weeks
2001-2004	EPI225: Infectious Disease Dynamics 5 medical students, 50 students of public health	Harvard School of Public Health 4-hr sessions per week for 8 weeks
2002	ID267: Infectious Disease Epidemiology Seminar 2 medical students, 8 students of public health	Harvard School of Public Health 2-hr sessions per week for 16 weeks
2002-2003	ID229: Epidemiology of Infectious Disease Developing Countries 50 students of public health	Harvard School of Public Health 2-hr session
2002	EPI269: Epidemiological Research in Obstetrics and Gynecology 30 advanced students of public health	Harvard School of Public Health 1-hr session
2003-2006	IMI202: Tuberculosis 10 medical students, 10 students of public health	Harvard School of Public Health 2-hr sessions
2003-2004	ID287: Bioterrorism: Public Health Preparedness and Response 30 students of public health	Harvard School of Public Health 1-hr session
2004-2007	EPI285: Infectious Disease Dynamics 50 graduate students of public health	Harvard School of Public Health 5-hr per week for 16 weeks
2008-2015	EPI501: Dynamics of Infectious Diseases 50 graduate students of public health	Harvard School of Public Health 4-hr sessions per week for 8 weeks

2008-2010	GHP539: The Social, Political and Economic Dimensions of Infectious Diseases in Developing Countries 20 medical and graduate students of public health	Harvard School of Public Health 2-hr session
2008	IMI 227: Genetics and Genomics of Infectious Diseases: Tuberculosis, Malaria 25 graduate students of public health	Harvard School of Public Health 2-hr session
2008-2015	ID269: Respiratory Epidemiology 18 medical and graduate students of public health	Harvard School of Public 2-hr sessions
2009-2011	IMI202: Tuberculosis the Host, the Organism and the Global 9 graduate students of public health	Harvard School of Public Health 2-hr session
2015, 2017, 2019	Epi225 Epidemiology of HIV 30 graduate students of public health	Harvard School of Public Health 2-hr session
2016 -	Epi502: Biology and Epidemiology of Antibiotic Resistance 20 graduate students of public health	Harvard School of Public Health 2-hr session
Harvard University/FAS		
2004	FAS Freshman Seminar 24p: How Epidemics Happen 12 undergraduate students	Harvard College, Cambridge, MA 3-hr sessions per week for 16 weeks
2005-2006	FAS Freshman Seminar 25m: Epidemics as a Metaphor 12 undergraduate students	Harvard College 2-hr sessions per week for 16 weeks
2006-2007	FAS Freshman Seminar 25m: What Epidemics Mean: Infectious Disease in a Social Context 12 undergraduate students	Harvard College 2-hr sessions per week for 16 weeks
<u>Formal Teaching of Residents, Clinical Fellows and Research Fellows (post-docs)</u>		
2003	The Transmission Dynamics of <i>M. tuberculosis</i> : Models and Molecular Epidemiology	Research Seminar Department of Epidemiology Harvard School of Public Health

		One-hour lecture
2004	Transmission of TB in the Community Invited Lecture	Infectious Disease Society of America Boston, MA One-hour lecture
2007	Genetic Heterogeneity in <i>M. tuberculosis</i>	Department of Genetics and Complex Diseases Harvard School of Public Health One-hour lecture

Clinical Supervisory and Training Responsibilities

1996-2007	Attending and supervision of clinical infectious disease fellows/Massachusetts General Hospital	Daily supervision for 6 weeks per year
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Laboratory and Other Research Supervisory and Training Responsibilities

2002-2004	Supervision of Julia E. Aledort, doctoral research fellow/Harvard School of Public Health	Weekly mentorship for 18 months
2002-2006	Supervision of Stephen Resch, doctoral research fellow/Harvard School of Public Health	Weekly mentorship for 18 months
2004-2006	Supervision of Johanna Daily, Master's student /Harvard School of Public Health	Monthly mentorship for 24 months
2007-2008	Supervision of Preetika Muthukrishnan, Master's student/Harvard School of Public Health	Weekly mentorship for 24 months
2009	Supervision of Daniel Pletzer, Undergraduate intern/Upper Austria University of Applied Sciences, Hagenberg, Austria	Daily laboratory mentorship for 3 months
2010	Supervision of Matsie Mphahlele, doctoral candidate at Stellenbosch University, Visiting Fogarty scholar	Weekly mentorship for 3 months

2010	Supervision of Laurence Laser, visiting Master's student from Ecole Polytechnique Federale de Lausanne	Weekly mentorship for 9 months
2018	Supervision of Junkun Ren, Master's student in epidemiology, Harvard T.H. Chan School of Public Health	Mentorship for 3 months

Formally Supervised Trainees and Faculty

1999-2004	Caroline Korves, ScD / Epidemiologist, Analysis Group, Inc. I was Dr. Korves's doctoral supervisor at the Harvard School of Public Health. Published two research papers together, one in PLoS Medicine and Clinical Infectious Disease.
2001-2006	Theodore Cohen, MD, MPH, DPH / Professor, Department of Epidemiology, School of Public Health, Yale University I was Dr. Cohen's DPH advisor at the Harvard School of Public Health and his primary mentor on his NIH K08 grant. Published 36 research papers together, including one in Science, one in Nature Medicine, and one in PNAS.
2003-2005	Anson Wright, MSc / WASH Advisor, Millennium Villages Project I supervised Ms. Wright's master's thesis on preparedness for a <i>Yersinia pestis</i> bioterrorism attack.
2004-2006	Kristina Wallengren, PhD, MPH / Executive Director and Founder, THINK (Tuberculosis and HIV Investigative Network) I was Dr. Wallengren's post-doctoral advisor at Harvard School of Public Health. We published three papers together.
2004-2010	Molly Franke, ScD / Assistant Professor, Department of Global Health and Social Medicine, Harvard Medical School I was Dr. Franke's doctoral advisor at Harvard School of Public Health and continue to mentor her in her role at HMS. We have published 18 research papers together.
2005-2010	Erin Johnson, PhD / Associate Professor, Department of Biology, John Carroll University I was Dr. Johnson's post-doctoral advisor at Harvard School of Public Health. Published two papers together in FEMS Immunology and Medical Microbiology and Infection and Immunity.
2005-2009	Hsien-Ho Lin, MD, MPH, ScD / Associate Professor in Epidemiology, Institute of Epidemiology and Preventive Medicine, National Taiwan University College of Public Health

I was Dr. Lin's advisor at Harvard School of Public Health. Published nine research papers together, including in PLoS Medicine, the Lancet, and American Journal Respiratory Critical Care Medicine.

- 2005-2011 Meghan Baker, MD / Instructor, Department of Population Medicine, Harvard Medical School and Harvard Pilgrim Health Care Institute
I was Dr. Baker's advisor at the Harvard School of Public Health, Boston, MA. We have published five papers together.
- 2006-2009 Andreas Sandgren, MSc, PhD / Deputy Head, ReAct Europe
I was Dr. Sandgren's post-doctoral research advisor at Harvard School of Public Health. We published three research papers together, including one in PLoS Medicine.
- 2006-2010 Christie Jeon, MSc, ScD / Assistant Professor, Cedars-Sinai Division of Hematology/Oncology and Department of Epidemiology, UCLA Fielding School of Public Health
I was Dr. Jeon's doctoral advisor at the Harvard School of Public Health. We published ten research papers together including one in PLoS Medicine.
- 2006-2011 Kathleen Wirth, ScD / Research Scientist, Department of Biostatistics, Harvard School of Public Health
I was Dr. Wirth's doctoral advisor at the Harvard School of Public Health. We published two papers together, including one in Epidemiology.
- 2006-2008 Caroline Colijn, PhD / Professor, Department of Mathematics, Simon Fraser University
I was Dr. Colijn's post-doctoral advisor at Harvard School of Public Health. Published twelve research papers together, including one in American Journal Respiratory Critical Care Medicine and one in PLoS Computational Biology.
- 2007-2009 Gape Machao, MSc / Monitoring and Evaluation Officer, UNICEF Botswana
I supervised Mr. Machao's master's thesis on rapid diagnostic testing for TB in Botswana.
- 2008-2010 Ellen Brooks-Pollock, MSc, PhD / Lecturer, Veterinary Public Health, Bristol Veterinary School
I was Dr. Pollock's post-doctoral research advisor at Harvard School of Public Health. We published two papers together.
- 2008-2013 Karen Jacobson, MD / Assistant Professor of Medicine, Section of Infectious Diseases, Boston University School of Medicine
I was Dr. Jacobson's research mentor for her infectious disease post-doctoral research fellowship. We published nine papers together.
- 2008-2010 Tsering Pema Lama, MSc. Postdoctoral Fellow / Consultant, The George Washington University Milken Institute School of Public Health

I supervised Ms. Lama's master's thesis.

- 2009-2015 Matthew Bonds, PhD / Assistant Professor, Department of Global Health and Social Medicine, Harvard Medical School
I was Dr. Bonds' mentor on his K award on poverty traps and currently mentor him in his role in my department. We have published five papers and two book chapters together.
- 2009-2012 Razvan Sultana, MD, PhD / Computational Biologist, University of Hawaii John A. Burns School of Medicine
I co-supervised Dr. Sultana's doctoral thesis in Bio-informatics at Boston University on genomic analysis of drug resistant TB. We have published three papers together.
- 2010-2016 Hanna Guimaraes, MA, PhD / Postdoctoral Researcher, RIVM National Institute for Public Health and the Environment
I was Ms. Guimaraes' doctoral adviser while she conducted research for her degree from Portugal. We published four papers together.
- 2010-2016 Maha Farhat, MD, MSc / Assistant Professor of Biomedical Informatics, Harvard Medical School
I was Dr. Farhat's postdoctoral mentor and supervised her analysis of whole genome sequence data on *M. tuberculosis* for the identification of novel mutations associated with drug resistance. We have published 12 papers together.
- 2010 Joanne Salmon, MD, MPH / Clinical Instructor, Division of Infectious Diseases, Department of Medicine, The University of British Columbia
I supervised Dr. Salmon's master's thesis on community health workers and impact on TB treatment outcomes: a multi-country proposal.
- 2010-2014 Chuan-Chin Huang, MS, ScD / Instructor in Medicine, Harvard Medical School
I was Dr. Huang's doctoral adviser. We have published eight papers together.
- 2010-2014 Olivia Oxlade, PhD / Epidemiologist and Modeler, McGill International TB Centre
I was Dr. Oxlade's postdoctoral research supervisor in her work on modeling the determinants of TB. We published three papers together.
- 2010-2016 MaryCatherine Arbour, MD / Assistant Professor of Medicine, Department of Global Health and Social Medicine, Harvard Medical School
I mentored this junior faculty member at the Division of Global Health Equity, Brigham and Women's Hospital in her work on education and health outcomes in a cluster randomized trial of school-based interventions in Santiago, Chile. We published two papers together.

- 2011 **Devra Barter, MS / Emerging Infections Epidemiologist, Colorado Department of Public Health & Environment**
I co-supervised Ms. Barter's master's thesis on out-of-pocket expenses during TB treatment which is published in BMC Public Health.
- 2011-2013 Silvan Vesenbeckh, MD / Senior Registrar, Infectious Diseases, Groote Schuur Hospital
I supervised Dr. Vesenbeckh's postdoctoral work on cholera transmission in the DRC and Haiti. We published three papers together.
- 2011-2015 Philips Loh, MS / Doctoral candidate, Department of Epidemiology, Harvard School of Public Health
I supervised Mr. Loh's master's thesis and served as his doctoral adviser.
- 2012-2013 Alexis Krumme, MS, ScD / Research Specialist, Division of Pharmacoepidemiology and Pharmacoeconomics, Brigham and Women's Hospital
I supervised Ms. Krumme's master's thesis. We published one paper together.
- 2012-2015 Xeno Acharya, MPH / Senior Consultant, Healthcare AI, PA Consulting
I was Mr. Acharya's doctoral adviser. We have published one paper.
- 2013-2014 **Anna Odone, MD, MPH, PhD / Associate Professor of Public Health, Università Vita-Salute San Raffaele**
I was Ms. Odone's postdoctoral research supervisor for her work on socioeconomic risk factors for acquired and primary MDR-TB in Lima, Peru. We published one paper together.
- 2013-2014 Sachin Atre, PhD / Study Coordinator, Johns Hopkins Center for Clinical Global Health Education
I supervised Dr. Atre's work on MDR-TB management and policy in India, and the effective use of information technology in TB control. We published one paper together.
- 2013-2015 Emilia Ling, MS / Medical Student, Stanford University
I supervised Ms. Ling's master's thesis at HSPH. We published one paper together.
- 2013-2016 Assumpta Mukabutera, PhD / Instructor, University of Rwanda School of Public Health
I supervised Dr. Mukabutera's doctoral thesis on rainfall and child health outcomes. We published three papers together.
- 2014-2016 Rebecca Butler, MS / Biostatistician, Kaiser Permanente
I supervised Ms. Butler's master's thesis.
- 2014-2016 Gustavo Velasquez, MD, MPH / Research Associate, Department of Global Health and Social Medicine, Harvard Medical School

I supervised Dr. Velasquez's postdoctoral work examining the relationship between phenotypic pyrazinamide resistance and multidrug-resistant tuberculosis (MDR-TB) treatment outcomes. We published four papers together.

- 2014-2017 Ibrahim Diakite, PhD / Associate Scientist in Modeling & Meta-Analysis, Pharmerit International
I supervised Dr. Diakite's postdoctoral project that aimed to advance the quantitative study of communicable diseases especially the Mycobacterium Tuberculosis by using a combination of different mathematical techniques such as differential equations, stochastic process, branching process, and mathematical game theory. We published two papers together.
- 2014-2018 Omowunmi Aibana, MD, MPH / Assistant Professor, General Internal Medicine, University of Texas McGovern Medical School
I supervised Dr. Aibana's work on Tuberculosis in Ukraine through a T32 mechanism based at Brown Medical School. We published five papers together.
- 2014-2019 Eric Mooring, MPhil, ScD / Epidemic Intelligence Service, Centers for Disease Control and Prevention
I was Dr. Mooring's doctoral adviser. We have published three papers together.
- 2014-2020 Ruoran Li, MPhil / Doctoral Student, Department of Epidemiology, Harvard T.H. Chan School of Public Health. I was Dr. Li's doctoral adviser. We have published one paper together.
- 2016-2018 Silvia Chiang, MD / Assistant Professor of Pediatrics, Brown Alpert Medical School
I supervised Dr. Chiang in her postdoctoral study of adolescent tuberculosis. We have published two papers together and have one under review.
- 2017-2018 Katrin Sadigh, MD / Fogarty Global Health Fellow, Harvard T.H. Chan School of Public Health
I supervised Dr. Sadigh in her clinical research as part of the Department of Infectious Disease, Brigham and Women's Hospital/Massachusetts General Hospital combined program.
- 2017-2019 Taylor Chin, BA / Master's student, Department of Epidemiology, Harvard T.H. Chan School of Public Health
I supervised Ms. Chin's master's thesis.
- 2017-2019 Tori Cowger, MPH / Doctoral Student, Department of Epidemiology, Harvard T.H. Chan School of Public Health
I was Ms. Cowger's doctoral adviser.

- 2017- Alexander Chu, MPH / Post-baccalaureate premedical candidate, Harvard Extension School.
- 2017- Annelies Mesman, PhD / Postdoctoral Research fellow, Department of Global Health and Social Medicine, Harvard Medical School. I supervised Annelies Mesman in her postdoctoral study of tuberculosis. We have published two papers together.
- 2019 Gerson Galdos Cardenas, PhD / Postdoctoral Research fellow, Department of Global Health and Social Medicine, Harvard Medical School.
- 2019- Kamela Ng, PhD / Postdoctoral Research fellow, Department of Global Health and Social Medicine, Harvard Medical School.
- 2019- Qi Tan, MD, PhD / Postdoctoral Research fellow, Department of Global Health and Social Medicine, Harvard Medical School.

Presentations

Invited Presentations and Courses

Local, Regional, National, and International Invited Presentations and Courses

Local Invited Presentations

No presentations below were sponsored by outside entities

- 2001 Styblo's Rule revisited
Freeman Symposium Research Seminar
Department of Epidemiology
Harvard School of Public Health
- 2002-2003 Molecular epidemiology of tuberculosis
Invited Lecture
Hot Topics Series
Harvard School of Public Health
- 2003 The transmission dynamics of *M. Tuberculosis*: Models and Molecular Epidemiology
Research Seminar
Department of Epidemiology
Harvard School of Public Health
- 2003 Inferring the evolution of *M. Tuberculosis* from comparative genomics
Research Seminar
Infectious Disease Unit
Harvard Medical School
- 2003 The epidemiology of Severe Acute Respiratory Syndrome (SARS)
Invited lecture

Kennedy School of Government
Harvard University

- 2003 Transmission dynamics, epidemiology and SARS
Research Seminar
Department of Epidemiology
Harvard School of Public Health
- 2003 Modeling the molecular epidemiology of TB
Freeman Symposium Research Seminar
Department of Epidemiology
Harvard School of Public Health
- 2003 Molecular epidemiology and the transmission dynamics of tuberculosis
Research Seminar
The Broad Institute
- 2004 The epidemiology of SARS
Hot Topic Series
Harvard School of Public Health
- 2005 Epidemiology of multi-drug resistant tuberculosis
Grand Rounds
Massachusetts General Hospital
- 2006 Iron metabolism and *M. Tuberculosis*
Research Seminar
The Broad Institute
- 2006 Natural variation in *M. Tuberculosis*
Research Seminar
The Broad Institute
- 2006 Avian influenza
Department of Environmental Health
Harvard School of Public Health
- 2006 Three epidemics and how they happened
Department of Epidemiology Seminar
Harvard School of Public Health
- 2006 Transmission dynamics of drug sensitive and resistant tuberculosis infectious disease
Research Seminar
Partners Infectious Disease
Boston, MA

2007	Genetic heterogeneity in <i>M. Tuberculosis</i> Department of Genetics and Complex Diseases Harvard School of Public Health
2007	Epidemiology of HIV and tuberculosis Department of Epidemiology Seminar Harvard School of Public Health
2008	A multi-disciplinary approach to MDR and XDR tuberculosis Department of Epidemiology Seminar Series Harvard School of Public Health
2008	Making multidisciplinary research work: the example of MDR tuberculosis Seminar Series Department of Social Medicine and Health Inequalities Brigham and Women's Hospital
2008	Conducting research in international settings Best Practices in International Scientific Collaboration (Panel discussion) 2nd annual New England Tuberculosis Retreat Harvard Initiative for Global Health Harvard Medical School
2009	Genomic epidemiology of MDR and XDR tuberculosis The Broad Institute
2009	A multi-disciplinary approach to XDR tuberculosis Grand Rounds Department of Medicine Brigham and Women's Hospital
2009	Social justice and the effort to address MDR TB Symposium on an Idea of Justice Harvard University and the China Research Council
2010	The evolution of drug resistant tuberculosis Grand Rounds Department of Medicine Massachusetts General Hospital
2010	Overview of Murray research team Freeman Symposium Research Seminar Department of Epidemiology Harvard School of Public Health

2011	Deans' Research Update Harvard School of Public Health
2011	Innovation in global health Massachusetts General Hospital Department of Medicine Bicentennial Reunion Department of Medicine Massachusetts General Hospital
2013	TB in the 21st century: the convergence of the infectious and metabolic diseases Seventh Annual New England Tuberculosis Symposium The Broad Institute
2014	Ebola and the research equity agenda Global Health Advisory Council Harvard Medical School Boston, MA
2015	Ebola Update Global Health Advisory Council Harvard Medical School Boston, MA
2015	HIV and TB co-infection Harvard T.H. Chan School of Public Health Boston, MA
2015	Burke Global Health Fellowship Symposium Harvard Global Health Institute Cambridge, MA
2017	Host and bacterial determinants of TB infection and disease: a longitudinal cohort study Spring Seminar Center for Communicable Disease Dynamics Harvard T.H. Chan School of Public Health, Boston, MA
2017	Host and bacterial determinants of TB infection and disease: insights from a large cohort study IDMP Seminar Broad Institute of MIT and Harvard, Cambridge, MA
2017	Tuberculosis and the vitamin A connection Talks at 12 Harvard Medical School
2018	How to write an NIH grant Training to Teachers Mongolia

Harvard Medical School

- 2020 SARS-CoV-2: Assessing the risks
Environmental Health Risk: Analysis and Applications (RISK0320)
Harvard T.H. Chan School of Public Health
- 2020 The epidemiology of COVID-19: Evaluation of Treatment and Response
GHSM Seminar - Social Medicine: Response to COVID-19
Harvard Medical School
- 2020 The Epidemiology of COVID-19
MassCPR webinar
- 2020 BCG and innate immune responses
Pathogenesis Working group
MassCPR webinar
- 2020 The transmission dynamics of COVID-19
BCMP Seminar
Harvard Medical School

Regional

No presentations below were sponsored by outside entities

- 2001 Genetics and phenotypic variability within *M. Tuberculosis*
Invited lecture
Boston University
- 2001 Problems in the molecular epidemiology of tuberculosis
Research Seminar
Massachusetts State Laboratory Institute (MSLI), Boston, MA
- 2006 Three epidemics
Kay Stratton Lecture
Massachusetts Institute of Technology, Cambridge, MA
- 2015 Converging epidemics: tuberculosis and diabetes
Oxford Immunotec
Marlborough, MA

National

No presentations below were sponsored by outside entities

- 2004 Transmission of TB in the community
Infectious Disease Society of America, Boston, MA

- 2006 Modeling MDR tuberculosis
National Partners Meeting on MDR Tuberculosis, Atlanta, GA
- 2006 Transmission dynamics of Drug Resistant tuberculosis
Interscience Conference on Antimicrobial Agents and Chemotherapy, San Francisco, CA
- 2008 Host iron metabolism genes
Workshop on Biofilms, Iron and Drug Refractory TB
Colorado State University, Fort Collins, CO
- 2008 The impact of strains diversity and mechanisms of strains competition
on the Potential Performance of New TB Vaccines
Microbial Diseases Lecture Series
Yale School of Public Health, Hartford, CT
- 2008 The role of mathematical modeling in evaluating interventions to control epidemics: the
example of tuberculosis
Howard Hughes Medical Institute
California Institute of Technology, Pasadena, CA
- 2008 An interdisciplinary approach to extensively drug resistant tuberculosis
Howard Hughes Medical Institute
California Institute of Technology, Pasadena, CA
- 2008 Number of MDR-TB and XDR-TB patients receiving treatment today:
Successes/Failures/Consequences
Forum on Drug Discovery, Development and Translation
Institute of Medicine of the National Academies, Washington, DC
- 2009 The evolution of XDR-TB in *M. tuberculosis*
Seminar Series Biology Department
Williams College, Williamstown, MA
- 2009 The evolution of XDR-TB in *M. tuberculosis*: a multidisciplinary approach
Grand Rounds Presentation
Division of Infectious Diseases
Hennepin County Medical Center, Minneapolis, MN
- 2009 Mathematical modeling
Infectious Diseases Clinical Cases Conference
Division of Infectious Diseases
Hennepin County Medical Center, Minneapolis, MN
- 2009 The evolution of XDR-TB: a multidisciplinary approach
2009 National TB Conference-TB Elimination-“It Takes a Village”
Centers for Disease Control and Prevention, Atlanta, GA

2009	The Gates Project overview Mycobacteriology Laboratory Branch (MLB) Division of Tuberculosis Elimination Seminar Centers for Disease Control and Prevention, Atlanta, GA
2010	Social, economic and biological determinants of tuberculosis Taskforce for Disease Eradication Carter Center Atlanta, Georgia
2010	Estimating the impact of social and biological determinants on TB and modeling their modification Texas School of Public Health Brownsville, Texas
2010	The evolution of XDR tuberculosis Mary Hitchcock Hospital Hanover, New Hampshire
2011	Molecular methods to detect drug resistance in <i>M. tuberculosis</i> Workshop on TB and HIV Diagnostics in Adult and Pediatric Populations National Institutes of Health Washington, DC
2011	Understanding the transmission dynamics of drug resistant tuberculosis: a multidisciplinary approach Annual Biomedical Research Conference for Minority Students St. Louis, Missouri
2012	Evolution of drug resistance World TB Day Symposium Boston University Boston, Massachusetts
2012	High throughput sequencing of drug resistance targets for Mycobacterium tuberculosis National Institute of Allergy and Infectious Diseases Sponsored meeting Washington, DC
2013	Genetic determinants of drug resistance in <i>Mtb</i> World TB Day Symposium Weill Cornell Medical College New York City, New York

- 2015 Tuberculosis and diabetes
The Comstock Lecture
Johns Hopkins School of Public Health
Baltimore, Maryland
- 2016 Tuberculosis and diabetes
20th Annual Conference of Union-North America Region/National TB Controllers
Association Joint Meeting
Denver, Colorado
- 2017 Risk factors for TB disease progression: evidence from a cohort study in Peru
9th Annual CEND (Center for Emerging and Neglected Diseases) Symposium:
Deconstructing TB: Insights from Fundamental Research
University of California, Berkeley, California
- 2017 Public health and the environment: interdisciplinary research and emerging infectious
disease
Ecology & Evolution of Infectious Diseases
UC Santa Barbara, California
- 2018 Women in science
2018 Women in Science Symposium
Colorado State University
Fort Collins, Colorado
- 2019 Who gets TB infection and disease in Lima, Peru
Epidemiology Grand Rounds
Columbia University Mailman School of Public Health
New York, New York
- 2019 Who gets TB infection and disease in Lima, Peru
UPGG Tuesday Seminar Series
Duke University
Durham, North Carolina

International

No presentations below were sponsored by outside entities

- 2001 Determinants of cluster distribution in *M. tuberculosis*
Research Seminar
University of Warwick, Coventry, United Kingdom

2002	Pathogenesis of tuberculosis Invited Lecture Peruvian Thoracic Society, Lima, Peru
2002	Problems in the molecular epidemiology of tuberculosis Research Seminar Karolinski Institutet, Stockholm, Sweden
2003	The fitness of MDR-TB: what do we know Invited Lecture World Health Organization, Tallin, Estonia
2004	Molecular epidemiology of TB in Sverdlosk, Russia Invited Lecture International Union Against Tuberculosis and Lung Disease (IUTLD) Meeting Moscow, Russia
2005	The fitness of MDR-TB strains Invited Lecture Desmond Tutu Center for Tuberculosis Research University of Stellenbosch, Matieland, South Africa
2005	The current and future status of Multi-Drug Resistant TB Invited Lecture Novartis Symposium on TB Drug Development, Bagamoyo, Tanzania
2006	XDR-TB surveillance Task Force on XDR-TB World Health Organization, Geneva, Switzerland
2007	Mathematical models of population effects of potential TB vaccines Keystone Symposium of Challenges of Global Vaccine Development Cape Town, South Africa
2007	Modeling vaccine effects Modeling Symposium at the 38 th Union World Conference on Lung Health Cape Town, South Africa
2007	Genomic epidemiology of infectious diseases: a new science US-Japan Meeting Hainan, China
2008	The molecular evolution of extensively drug resistant tuberculosis Keystone Symposium of Pathogenesis and Control of Emerging Infections and Drug-Resistant Organisms

Bangkok, Thailand

- 2008 TB Drug Resistance Mutation Database
39th Union World Conference 2008
International Union of TB and Lung Disease
Paris, France
- 2009 The evolution of multi-drug resistance in *M. tuberculosis*
Engineering and Physical Sciences Research Council Workshop
on the Evolution of Antibiotic Resistance
Imperial College, London, England
- 2009 The evolution of multi-drug resistance in *M. tuberculosis*
School of Biosciences Seminar Series
University of Birmingham, Birmingham, England
- 2009 Diagnosis of drug resistant TB
Fondation Mérieux International Scientific Conference on Latest Approaches to HIV
Infection Management: A Focus on HIV, TB and HIV/Hepatitis Co-Infection
New Delhi, India
- 2009 Tuberculosis and diabetes: interactions between two epidemics
TB/DM Expert Meeting
International Union of TB and Lung Disease
Paris, France
- 2009 Differences between epidemiology of TB in rich and poor countries
Union World Conference of Lung Health
Cancun, Mexico
- 2009 Modeling the potential impact of changing risk factors and social determinants
Union World Conference of Lung Health
Cancun, Mexico
- 2010 The evolution of drug resistance in TB
Ecole Polytechnique Federale de Lausanne
Lausanne, Switzerland
- 2010 Identification of drug resistance mutations in *M. tuberculosis*
Fondation Mérieux
Annecy, France
- 2010 Guidelines for management of tuberculosis and diabetes
World Health Organization
Geneva, Switzerland

- 2010 Data for developing diagnostics for MDR TB
Christian Medical College
Vellore, India
- 2010 Beyond labs and pills for improved tuberculosis control: what role for TB programmes?
41st Union World Conference on Lung Health
Berlin, Germany
- 2011 Iron transport polymorphisms and TB susceptibility
Ecole Polytechnique Federale de Lausanne
Lausanne, Switzerland
- 2011 Evaluating health interventions using DHS oversamples
Doris Duke Charitable Foundation Population Health Implementation Training Partnership
Grantee Meeting
Ifakara, Tanzania
- 2012 Overview: Transmission dynamics and epidemiology of drug resistant TB
Lima, Peru
- 2012 The transmission dynamics of drug resistant TB
Harvard China Fund
Shanghai, China
- 2012 Understanding the epidemic dynamics of drug resistant TB
Keystone Symposia Conference – Drug Resistance and Persistence in Tuberculosis
Kampala, Uganda
- 2012 The social, environmental and biologic determinants of tuberculosis
TB Day in Braga: From the hospital to the bench and back.
Braga, Portugal
- 2012 Studying the link between nutrition and TB Risk: problems and strategies
International Conference of the Union for TB and Lung Disease
Kuala Lumpur, Malaysia
- 2012 TB and diabetes: what we know, what we don't know
International Conference of the Union for TB and Lung Disease
Kuala Lumpur, Malaysia
- 2013 Genetic diversity of DR TB: implication for future diagnostics
Institute of Medicine and Chinese Academy of Sciences Workshop

The Global Crisis of Drug-Resistant Tuberculosis and the Leadership of the BRICS Countries: Challenges and Opportunities
Beijing, China

- 2013 Evolution of drug-resistance in TB genomes
International Conference of the Union for TB and Lung Disease
Paris, France
- 2014 The genetics and pathogenesis of MDR and XDR TB drug resistance
Conference on Retroviruses and Opportunistic Infections (CROI)
Boston, MA
- 2014 Genetic basis for transmission of MDR-TB
9th International Conference on the Pathogenesis of Mycobacterial Infections
Stockholm, Sweden
- 2015 Issues in the management and prevention of drug resistant and sensitive TB
Invited Lecture
Bogomolets National Medical University
Kiev, Ukraine
- 2015 TB and diabetes mellitus outcomes
19th Annual Conference of the Union-North America Region
Vancouver, BC, Canada
- 2015 The transmissibility of drug resistant TB
RePort Consortium Meeting
Boston University
Boston, Massachusetts
- 2015 The TB drug resistance database
46th Union World Conference on Lung Health
Cape Town, South Africa
- 2016 Diabetes and environmental co-morbidities with TB
Keystone Symposia Conference - Tuberculosis Co-Morbidities and Immunopathogenesis
Keystone, Colorado
- 2016 Enabling next generation whole genome sequencing readouts directly from sputum
samples and in the clinic: hype or hope?
47th Union World Conference on Lung Health
Liverpool, United Kingdom

2017	Infectiousness and transmission of tuberculosis American Thoracic Society 2017 International Meeting Washington, DC
2017	Recent insights in the meaning of latency in tuberculosis 30th Annual Doctor Dorothy Wiselberg Seminar McGill University Montreal, QC, Canada
2017	Next generation whole genome sequencing for tuberculosis: ready for clinical practice? 48th Union World Conference on Lung Health Guadalajara, Mexico
2017	Estimating the adolescent tuberculosis burden in the 30 high-TB burden countries 48th Union World Conference on Lung Health Guadalajara, Mexico
2017	Insights into TB from a longitudinal cohort study in Lima, Peru National TB program Lima, Peru
2018	Insights into TB from a longitudinal cohort study in Lima, Peru Otago University Dunedin, New Zealand
2018	Grant Writing Mongolian National University of Medical Sciences Ulaanbaatar, Mongolia
2019	Bacterial determinants of TB progression 50 th Union World Conference on Lung Health Hyderabad, India
2019	Genetic variations of mycobacterium tuberculosis that are associated with tuberculosis transmission 50 th Union World Conference on Lung Health Hyderabad, India
2020	The COVID-19 Research Agenda Partners in Health
2020	SARS-CoV-2 Partners in Health

Report of Clinical Activities and Innovations

Current Licensure and Certification

1996	Licensed in Medicine in Massachusetts
1996	Board Certified in Internal Medicine
1997	Board Certified in Infectious Disease

Practice Activities

1998 – 2007	Attending Physician	Infectious Disease Consult Services, MGH, Boston, MA	3-5 new consults, 20- 30 follow-ups per day 3-6 weeks per year
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The unit provides consults on infectious disease issues to all medical, surgical and other specialty wards. I saw patients referred to the specialty unit in conjunction with a team that includes an infectious disease fellow and rotating medical students and residents. In addition to this bedside clinical teaching, I also participated in weekly clinical conferences and seminars that are designed to maximize teaching.

Report of Scholarship

Peer reviewed publications in print or other media

Research investigations

1. Murray MJ, Murray NJ, Murray AB, **Murray MB**. Refeeding-malaria and hyperferraemia. Lancet 1975;1:653-4.
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Murray, MB. Problems in the Molecular Epidemiology of Tuberculosis [Dissertation]. Boston (MA): Harvard School of Public Health; 2001.

Narrative

To date, my career has focused on two main areas: advancing progress in tuberculosis management and control and developing research capacity in low and middle-income countries.

My work on tuberculosis has shifted over the past twenty years from a focus on dynamical modeling of TB epidemics to field studies on the bacterial and host determinants of TB infection and disease. Between 2008-2013, I led a multi-disciplinary consortium that studied the impact of drug resistance on the transmission dynamics of tuberculosis in Lima, Peru. This project followed over 18000 people for TB-associated outcomes and has generated data that has allowed my team to also address a range of host and environmental factors that contribute to the transmission and disease burden of TB. More recently, our work in this area has centered on the links between host metabolic and immune function as determinants of the outcome of TB infection. This work, which is funded through an NIH consortium grant which I co-lead with Dr. Branch Moody, is another multi-disciplinary collaboration, this time among immunologists, epidemiologists, geneticists and veterinary pathologists.

My work on drug resistant tuberculosis has also led me to use targeted and whole genome sequencing to study “genomic epidemiology” and to elucidate the genetic basis of drug resistance phenotypes. To date, we have sequenced over 1500 TB strains and have created an innovative data interface tool that allows us to use whole genome data in epidemiologic studies. Currently, we are funded by NIH to identify, collect, archive, sequence and analyze the drug resistance genes in *M. tuberculosis* strains from around the world. These data are then passed to our collaborators who attempt to validate our findings by generating and phenotyping *Mtb* variants and to our industry partners who are developing point of care diagnostic tests to detect drug resistance. I am the PI of this collaborative project which is funded through an NIH Center for Excellence in Translational Research.

In addition to my roles on my grant-funded projects, I am the research director for the Division of Global Health Equity in the Department of Medicine at the Brigham and Women’s Hospital and the non-governmental organization, Partners In Health (PIH). In that capacity, I support the research mission of the Global Health Delivery Partnership by building research infrastructure and mentoring junior faculty interested in research careers. At HMS, I lead the Department of Global Health and Social Medicine’s “research core,” a team of eight epidemiologists, biostatisticians and programmers in the task of identifying and developing research opportunities in affiliation with PIH and other NGO’s clinical field sites. Much of this work focuses on developing methods to evaluate the health interventions implemented in these sites and in designing and carrying out studies to conduct such evaluations. Increasingly, our mission has encompassed the training and development of independent researchers from the countries in which we work.

Almost all my academic work has been conducted in the context of training graduate students and post-doctoral fellows. I have directly supervised 39 graduate students or post-doctoral fellows, almost all of whom have published with me. Fourteen of my former trainees have gone

on to tenure track faculty positions and six have joined international and non-governmental organizations focused on global health. Among many committee assignments, I am particularly proud of my contribution to the Task Force on Women in Science and Engineering which made recommendations that I believe have improved the working lives of many women in science at Harvard. I have served on the Human Subjects Committee at HSPH, co-chaired the Community Engagement Mission of the Strategic Leadership Team at the Brigham and Women's Hospital and led a number of junior and senior faculty searches.

**IN THE UNITED STATES DISTRICT COURT
FOR THE MIDDLE DISTRICT OF NORTH CAROLINA**

DEMOCRACY NORTH CAROLINA, THE
LEAGUE OF WOMEN VOTERS OF
NORTH CAROLINA, DONNA PERMAR,
JOHN P. CLARK, MARGARET B. CATES,
LELIA BENTLEY, REGINA WHITNEY
EDWARDS, ROBERT K. PRIDDY II,
WALTER HUTCHINS, AND SUSAN
SCHAFFER.

Plaintiffs,

vs.

THE NORTH CAROLINA STATE BOARD
OF ELECTIONS; DAMON CIRCOSTA, in
his official capacity as CHAIR OF THE
STATE BOARD OF ELECTIONS; STELLA
ANDERSON, in her official capacity as
SECRETARY OF THE STATE BOARD OF
ELECTIONS; KEN RAYMOND, in his
official capacity as MEMBER OF THE
STATE BOARD OF ELECTIONS; JEFF
CARMON III, in his official capacity as
MEMBER OF THE STATE BOARD OF
ELECTIONS; DAVID C. BLACK, in his
official capacity as MEMBER OF THE
STATE BOARD OF ELECTIONS; THE
NORTH CAROLINA DEPARTMENT OF
TRANSPORTATION; J. ERIC BOYETTE,
in his official capacity as
TRANSPORTATION SECRETARY; THE
NORTH CAROLINA DEPARTMENT OF
HEALTH AND HUMAN SERVICES;
MANDY COHEN, in her official capacity as
SECRETARY OF HEALTH AND HUMAN
SERVICES,

Defendants.

Civil Action No. 20-cv-457

**DECLARATION OF PAUL GRONKE IN SUPPORT OF PLAINTIFFS’
MOTION FOR PRELIMINARY INJUNCTION**

1. I am a Professor of Political Science at Reed College and Director of the Early Voting Information Center. I received a BA in Political Science from the University of Chicago, a Master's Degree in Western European Politics from the University of Essex, Colchester UK, and a PhD in Political Science from the University of Michigan. I have written scientific research publications on voting by mail, early voting, voter turnout, and election administration that have appeared in peer-reviewed journals and university press edited volumes. I have written and collaborated on policy reports on public opinion and the opinions of local election officials (LEOs) about elections and election administration. The principal focus of my research and writing since 2006 has been early voting, election administration, local election officials, and public opinion about elections, election reform, and electoral integrity.
2. I created the Early Voting Information Center (EVIC) in 2006 as a non-partisan center for the study of non-precinct place voting in the United States. EVIC has attracted more than \$1,000,000 in funding from public charities, non-profits, state governments, and federal agencies. As the Director of EVIC, I regularly consult with election officials at the local and state level to help them anticipate and plan for the changes wrought by the growth in early in-person, no-excuse absentee, and vote by mail voting. I worked as a contractor and subcontractor in 2006 and 2008 for the federal Election Assistance Commission, helping to oversee the collection, analysis, and reporting of election administration data pertaining to the National Voter Registration Act, the Uniformed Overseas and Citizens Abroad Voting Act, and the Election Administration and Voting Survey. I helped develop the section of the Election Assistance Commission's Election

Administration and Voting Survey (EAVS) that asks for information about early in-person and absentee ballots. I designed the survey questions for early voting used by two highly regarded academic election surveys, the Cooperative Congressional Election Study (CCES) and the American National Election Study.

3. I have published a number of articles that contain statistical analyses of national, regional, and state trends in voting by mail, early voting, and the demographic and attitudinal characteristics of individual early in-person and no-excuse absentee voters. These publications include peer-reviewed articles in *American Politics Research* (2012), the *Annual Review of Political Science* (2008), the *Journal of Social Issues* (2008), and *PS: Political Science and Politics* (2007). Other published works that discuss the legal and administrative changes to early voting and the public response include a 2015 *Electoral Studies* article, a 2014 chapter in *Measure of American Elections*, a 2008 *William and Mary Law Review* article, a 2008 chapter in *Democracy in the States*, and 2019, 2016, and 2008 chapters in editions of *America Votes! A Guide to Election Law and Voting Rights*. A complete list of my publications is included in my curriculum vitae, attached to this document.
4. In light of my scientific expertise, I was retained to give expert testimony in *League of Women Voters v. State of North Carolina* (Civil Action No. 1:13-CV-660, 2014-2015) and provided an expert report in *Ohio State Conference of the NAACP, et al. vs. John Husted et al.* (Case No. 2:14-cv-00404, Summer 2014).
5. I have been retained to opine on the impact of the COVID-19 pandemic on administering the November 3, 2020, general election in North Carolina. Specifically, I have been asked to opine on (1) the

impact of the COVID-19 pandemic on administering in-person voting (early and on Election Day); (2) the impact of the COVID-19 pandemic on by-mail voting; (3) the evidence accumulated so far in 2020 regarding the best mix of in-person and by-mail voting options; and (4) when and how state and local election administrators in North Carolina need to act in order to assure a safe, secure, and accessible election this fall.

6. My expert opinion is that the State of North Carolina needs to act immediately to assure a safe, secure, and accessible election in November. The state should encourage county boards to immediately identify sufficient in-person voting locations for early voting and precinct place voting, and require that this information be publicly released at the earliest possible instance. The state should suspend the uniform hours requirement for satellite early in-person voting locations and should suspend the requirement that a majority of poll workers reside within an election precinct. The state should allow for electronic requests of absentee ballots and suspend the requirement for two witness signatures on the returned ballot materials. Finally, the state should assure that sufficient resources are available to every county board to implement these changes.

I. Background on Voting By Mail

A. National Trends

7. Voting by mail is a method of balloting in which a ballot is produced by a local election official, transmitted to an eligible voter using the United States Postal Service (in most cases¹); an eligible citizen

¹ The Federal Military and Overseas Voter Empowerment Act (MOVE) requires states to provide blank absentee ballots to UOCAVA (Uniformed and Overseas Citizens Absentee Voting Act) voters in at least on electronic format – email, fax, or an online delivery system – at least 45 days before an election.
<https://www.fvap.gov/uploads/FVAP/Policies/moveact.pdf>

completes the ballot and provides additional validating information (in most cases, a signature, although 12 states require additional or alternate verifying information, such as a notary or witness signature, copy of a valid identification, or copy of an identification and a witness or notary signature²); and the ballot is returned using the United States Postal Service or is returned to a designated drop box or elections office.

8. The terminology used to describe voting by mail can be a point of confusion. Historically, this method of voting has been called “absentee voting” because the assumption is made that an eligible voter is sent and casts a ballot outside of an elections office or polling place on Election Day because the voter is “absent” and unable to appear on Election Day. Absentee voting was first made available in nineteen of twenty-five states in the 1864 election so that soldiers in the field could exercise the franchise.³ By the end of World War II, most states provided for some sort of civilian access to an absentee ballot for a variety of reasons: business travelers, railroad workers, and citizens who were sick and infirm. With the ratification of the 26th Amendment and the addition of many college students to the voting rolls, many states extended absentee balloting rights to students. In 1975, the passage of the Overseas Citizens Voting Rights Act (Pub. L. No. 94-203, 89 Stat. 1142 (1976)) extended absentee balloting to citizens living overseas. In all of these cases, the voter is presumed to have a legally specified reason for being “absent” on Election Day.
9. I will refer in this document to this method of balloting as “excuse-

² State requirements for verifying absentee ballots are documented by the National Conference of State Legislatures. <https://www.ncsl.org/research/elections-and-campaigns/verification-of-absentee-ballots.aspx>.

³ Fortier, John C. 2006. *Absentee and Early Voting: Trends, Promises, and Perils*. Washington, D.C.: AEI Press.

required absentee voting.” As of the time of this writing, sixteen states require an excuse for requesting an absentee ballot.

10. In the late 1980s, beginning with California in 1978, and followed by a number of additional states in the 1980s and 1990s, many states removed the need for a designated excuse to request an absentee ballot, thus giving rise to a second method, most commonly referred to as “no-excuse absentee voting.”⁴ Today, thirty-four states and the District of Columbia, including North Carolina, do not require an excuse to vote absentee by mail.⁵
11. Finally, five states among those thirty-four are “fully vote by mail,” sometimes referred to as “universal ballot delivery” states. This method was first put in place in Oregon in 2000, and is also used by Colorado, Hawaii, Utah, and Washington. In a fully vote by mail system, every valid registered voter on the registration rolls is sent a ballot without the need to file a request. These fully vote by mail states do not operate precinct polling places, although states continue to provide in-person voting services at county offices and, in some cases, designated voting centers in addition to county offices.

⁴ John Fortier, 2006, *Absentee and Early Voting: Trends, Promises, and Perils*. Washington, DC: AEI Press.

⁵ N.C. Gen. Stat. § 163-226(a)

12. The following figure, reproduced from the National Conference of State Legislatures,⁶ provides a visual representation of these three different “voting by mail” voting regimes. As the figure makes clear, no-excuse absentee voting is available in every region of the country.

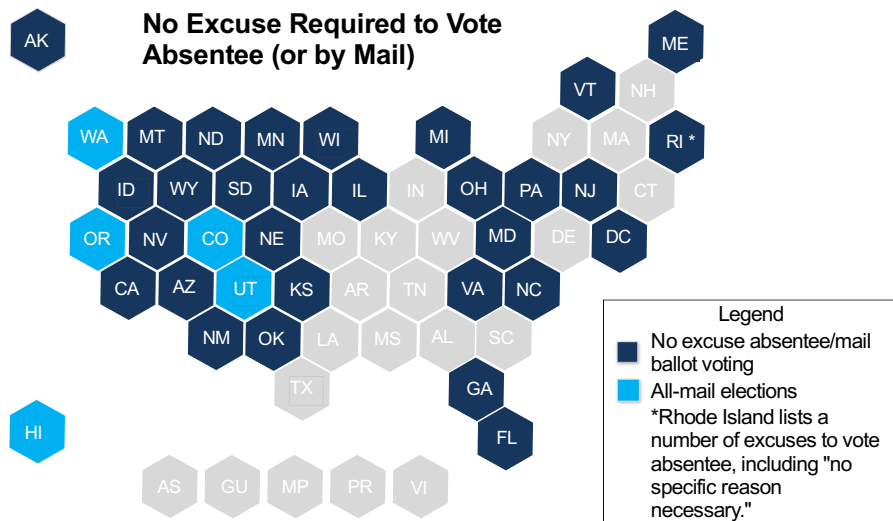


Figure 1: Vote By Mail Options as of May 2020

13. For the purposes of this report, I will rely on the umbrella term “voting by mail” to refer to the no-excuse absentee election administration system that is currently in place in North Carolina and other states. When I refer to a citizen “voting by mail,” I refer to the individual act of casting the absentee ballot, regardless of the state in which they live.
14. The use of voting by mail and early in person voting has grown as these methods became more widely available across the country. The Census Bureau has conducted the Current Population Survey (CPS) Voting and Registration Supplement in November of federal election years since 1960.⁷ The CPS is a large random sample survey that is an

⁶ Source: <https://www.ncsl.org/research/elections-and-campaigns/absentee-and-early-voting.aspx>

⁷ <https://www.census.gov/topics/public-sector/voting.html>

authoritative source to compare registration and voting in the United States. The following figure displays the percentage of respondents nationwide who report voting on Election Day, voting early in-person, and voting by mail from 1996-2018 (prior to these years, the CPS did not ask about when the ballot was cast). According to the CPS survey data, Election Day voting comprised more than 90% of ballots cast in 1996, and just over 5% of the survey respondents said that they cast a ballot by mail. Twenty-two years later, according to the CPS survey conducted after the November 2018 election, 23.1% of CPS respondents said they cast a ballot by mail.⁸

⁸ 2018 Current Population Survey Voting and Registration Supplement, Table 14, “Method of Voting by Selected Characteristics: November 2018.” <https://www.census.gov/data/tables/time-series/demo/voting-and-registration/p20-583.html>

The Growth of Early Voting, 1996 - 2018

Source: Current Population Survey, Voting and Registration Supplement

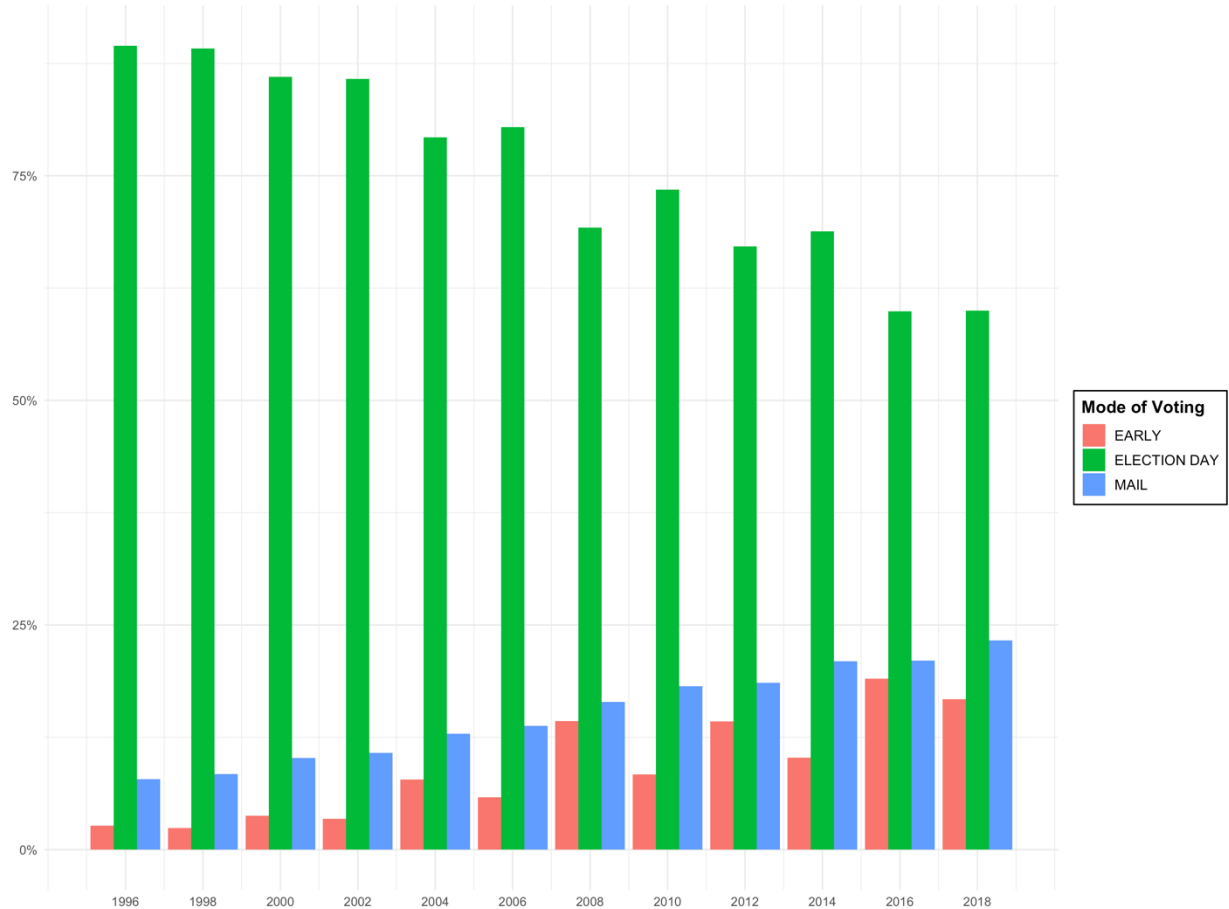


Figure 2: Election Day, Early In Person, and Voting By Mail from 1996-2018

B. North Carolina

15. North Carolina removed the need for an excuse to request an absentee ballot in 2001.⁹ Figure 3 details the percentage of voters in North Carolina who report casting a ballot on Election Day, Early In Person, and By Mail from 1996-2018, using data from the CPS Voting and Registration Supplement.¹⁰ Official voter turnout statistics from the State of North Carolina indicate that 5.5% of ballots were cast absentee by mail in 2016¹¹

⁹ N.C. Gen. Stat. § 163-226(a).

¹⁰ Calculated by the author using the CPS Voting and Registration Supplement survey datasets.

¹¹ Source: NC Board of Elections, https://s3.amazonaws.com/dl.ncsbe.gov/ENRS/2016_11_08/absentee_stats_20161108.pdf

and 2.4% of ballots were cast absentee by mail in 2018.¹²

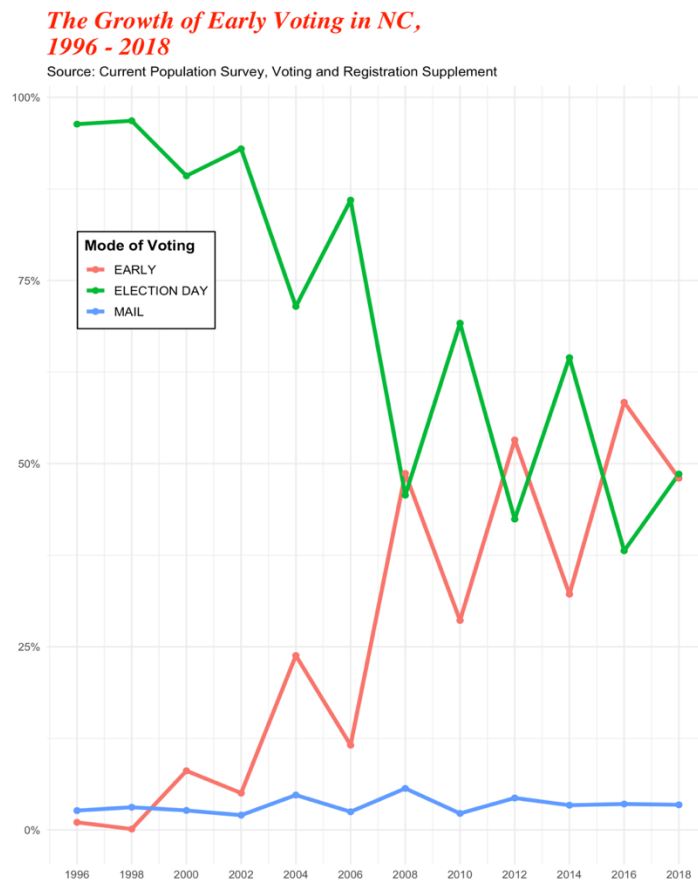


Figure 3: Use of Election Day, Early In Person, and Voting By Mail In North Carolina

16. Usage of voting by mail remains very low in North Carolina, something that distinguishes the state from other states that do not require an excuse to request an absentee ballot. According to data reported by the Federal Election Assistance Commission's Election Administration and Voting Survey, in 2016 North Carolina has the seventh lowest percentage of ballots that were cast absentee by-mail.

¹² Calculated by the author from the 2018 absentee ballot (https://dl.ncsbe.gov/?prefix=ENRS/2018_11_06/) and the total ballots cast in 2018 (https://er.ncsbe.gov/?election_dt=11/06/2018&county_id=0&office=FED&contest=0).

Among the states that did not require an excuse for casting an absentee ballot, North Carolina ranked lowest in terms of the percentage of ballots cast absentee by-mail.¹³

17. One possible reason for this is that North Carolina rejects many absentee ballots. In Figure 4, I report the average percentage of absentee ballots rejected in 2012, 2014, 2016, and 2018 among four kinds of states: states with all vote by mail, states with high vote by mail usage (50% and higher), states with mid-tier vote by mail usage (20-50%), and states with mostly polling places. Thirty-one states, including North Carolina, fall into the “mostly polling places” category.¹⁴ As shown in the figure, mail ballot rejection rates in states that mainly use polling places are substantially higher than in states with more extensive by-mail balloting. North Carolina stands out as having a rejection rate higher than the average in the “mostly polling place” (less than 20% by mail ballots) in 2014, 2016, and 2018.

¹³ Comparisons calculated by the author. Percentages were calculated by dividing the number of absentee ballots counted by turnout, from Pg. 23-25, Table 2, of the Election Assistance Commission, *The Election Administration and Voting Survey: 2016 Comprehensive Report*.

https://www.eac.gov/sites/default/files/eac_assets/1/6/2016_EAVS_Comprehensive_Report.pdf

State absentee ballot laws in 2016 were taken from the National Conference of State Legislatures. As of October 2018, the NCSL reported that Alabama, Arkansas, Connecticut, Delaware, Indiana, Kentucky, Louisiana, Massachusetts, Michigan, Mississippi, Missouri, New Hampshire, New York, Pennsylvania, Rhode Island, South Carolina, Tennessee, Texas, Virginia, and West Virginia were the states that required an excuse to cast an absentee ballot. <http://www.ncsl.org/research/elections-and-campaigns/absentee-and-early-voting.aspx>.

¹⁴ Calculations were made by the author. State absentee usage categories are determined by the 2018 absentee ballot rate, calculated using the 2018 EAVS, as described in Footnote 13. .

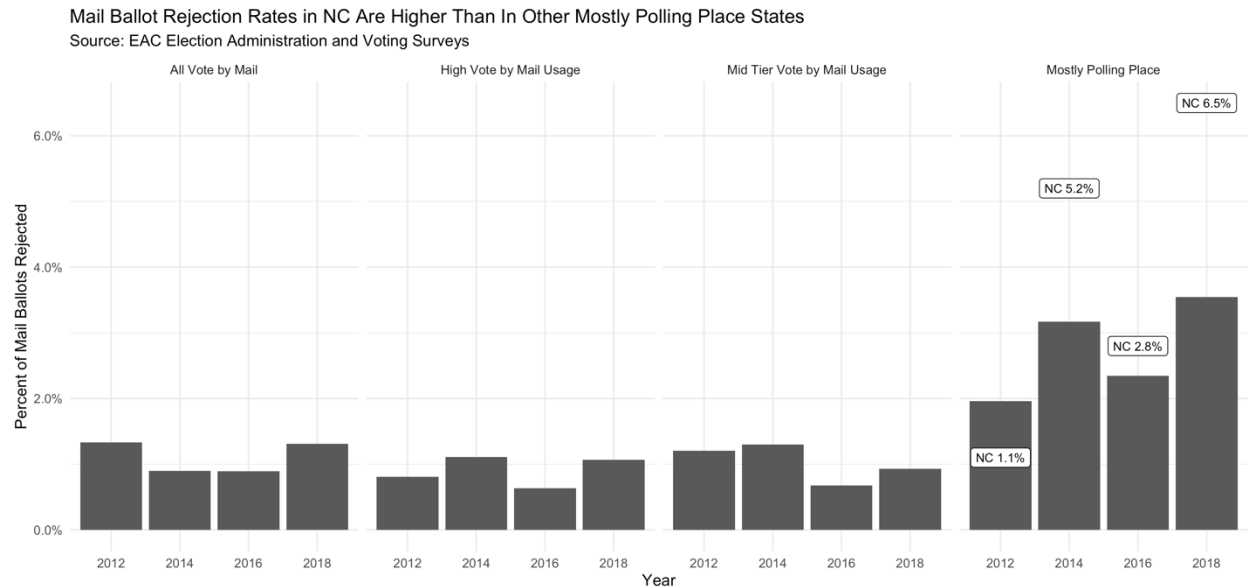


Figure 4: Mail Ballot Rejection Rates in the 2014 – 2018 Elections

18. Voters in North Carolina have shown a strong preference to continue to cast a ballot at a precinct place or at an early in-person voting location, even though no-excuse absentee balloting has been available for nearly two decades. In the following sections of the report, I examine how COVID-19 impacts the administration of in-person and by-mail voting.

II. The Impact of the COVID-19 Pandemic On Administering Elections

A. In-Person Voting

19. The Centers for Disease Control and Prevention (CDC) has issued interim guidance for election polling locations to prevent the spread of the novel coronavirus that causes COVID-19. The recommendations include: encouraging mail-in voting, encouraging early voting, relocating polling places from locations that would put certain populations at risk (e.g. nursing homes and senior living residences), and adding social distancing measures to protect

individuals during voting.¹⁵

20. Expert reports that have been issued since the onset of the pandemic recommend that election officials “develop techniques to spread out arrivals to polling places so that they are more even throughout the day.”¹⁶ Election officials are urged to obtain and provide personal protective equipment and other supplies to assure the safety of poll workers and voters.¹⁷
21. Election officials may need to identify additional polling sites in order to provide a safe voting environment. The Ad Hoc Committee for 2020 Election Fairness and Legitimacy at the University of California-Irvine argues that additional in-person voting locations may be necessary:

To the extent [election officials] have discretion, they can increase the number of polling places and decline to consolidate polling places. By minimizing the number of voters assigned to each location, election officials can reduce crowd size, shorten lines, and promote social distancing.¹⁸

North Carolina laws and policies need to be adjusted in order to allow election officials to implement these recommendations, find new polling locations, and communicate these changes to voters.

22. Some areas may need to consolidate polling places because some

¹⁵ Centers for Disease Control, “Recommendations for Election Polling Locations.” March 27, 2020. <https://www.cdc.gov/coronavirus/2019-ncov/community/election-polling-locations.html> Accessed May 21, 2020.

¹⁶ Nathaniel Persily and Charles Stewart, III, March 19, 2020, “Ten Recommendations To Ensure A Healthy and Trustworthy 2020 Election,” *Lawfare*, <https://www.lawfareblog.com/ten-recommendations-ensure-healthy-and-trustworthy-2020-election> Accessed May 20, 2020.

¹⁷ Christopher R. Deluzio, Elizabeth Howard, David Levine, Paul Rosenzweig, and Derek Tisler. April 20, 2020. “Ensuring Safe Elections.” Report of the Brennan Center for Justice. https://www.brennancenter.org/sites/default/files/2020-04/2020_04_5StateCostAnalysis_FINAL.pdf Accessed May 20, 2020; Ad Hoc Committee for 2020 Election Fairness and Legitimacy. April 2020. “Fair Elections During A Crisis.” Irvine, CA: University of California, Irvine Law School. <https://www.law.uci.edu/faculty/full-time/hasen/2020ElectionReport.pdf>. Pg. 7.

¹⁸ UCI Ad Hoc Committee Report, pg. 7

locations that have traditionally been used (e.g. schools, long-term care facilities, retirement homes) are no longer available. As the National Conference of State Legislatures' "Covid-19 and Elections" website notes:¹⁹

Poll workers may not be as willing to serve due to health risks, which can make running an election more challenging. Moving to consolidated polling places—in which several precincts vote at the same location—or moving to vote centers—in which any voter from a jurisdiction can vote at any polling place, usually a larger facility—can reduce the total number of poll workers required.

23. But precinct consolidation sometimes comes with dire consequences, including longer lines and longer distances to polling sites, which can have a negative effect on voter turnout, as reported below. The state needs to do what it can to mitigate poll worker shortages, such as removing the requirement that a majority of poll workers be residents of the local precinct.
24. Identifying new polling locations, whether as part of a process of consolidation or adding new locations (and reassigning voters) takes time, resources, and expertise. For example, in California, the California Civic Engagement Project (CCEP) was engaged in 2017²⁰ to provide assistance to counties that sought to locate vote centers, which are required by the California Voters Choice Act²¹ for any county that moved to a universal absentee ballot delivery system, starting with the 2018 election. The CCEP developed a sophisticated

¹⁹ National Conference of State Legislatures, 5/21/2020, "COVID-19 And Elections," <https://www.ncsl.org/research/elections-and-campaigns/state-action-on-covid-19-and-elections.aspx>, accessed May 25, 2020.

²⁰ Personal communication with Dr. Mindy Romero, June 2, 2020.

²¹ The Voters Choice Act was passed and signed into law in 2016. <https://elections.cdn.sos.ca.gov/vca/sb450-chaptered-legislation.pdf>

methodology²² to optimally locate vote centers and mail-ballot drop boxes.

25. A failure to locate polling places and voting centers that are convenient and accessible can discourage some citizens from voting. The 2018 Current Population Survey's Voting and Registration Supplement asked a sample of U.S. citizens why they did not vote in the 2018 midterm election. The most common response of respondents (27%) was "too busy, conflicting schedule," another 3.3% cited an "inconvenient polling place," and 2.9% said they faced "transportation problems." There are substantial differences in how these barriers impact subgroups of the voting population. As shown in Table 1, only 6% of the oldest voters (65 and older) said that "conflicting schedules" were a reason that they did not vote, compared to 35.4% of voters aged 25 to 44. Younger voters (18 to 24) were most impacted by an "inconvenient polling place," over three times as much as the oldest voters.²³ Other obstacles to voting that can reduce turnout are waiting in long lines to vote and less accessible voting locations that require longer travel distances and have limited parking.²⁴

²² <https://ccepsitingtool.github.io/methodology.html>

²³ All data from the 2018 Current Population Survey, Voting and Registration Supplement, Table 10, <https://www.census.gov/data/tables/time-series/demo/voting-and-registration/p20-583.html>, accessed February 26, 2020.

²⁴ Stein, Robert M, and Greg Vonnahme. 2008. "Engaging the Unengaged Voter: Vote Centers and Voter Turnout." *The Journal of Politics* 70(02): 487–97.

Table 1: Reasons for Not Voting, 2018 CPS

	Too Busy, Conflicting Schedule	Transportation Problems	Inconvenient Polling Place
Overall	26.9	2.9	3.3
18 to 24 years	31.0	1.1	4.3
25 to 44 years	35.4	2.0	3.5
45 to 64 years	25.3	3.1	3.7
65 years and over	6.0	6.3	1.2

26. Research also shows that greater distance between voters and polling places, which can result from precinct consolidation, can negatively impact voter turnout. In a study of three Maryland counties, Gimpel and Schuknecht (2003), looked at the impact of distance and of other impediments (such as speed limits, traffic congestion, or topographical barriers) that stand in the way of getting from point A to point B on turnout in the 2000 presidential election. They found that the geographic accessibility of polling places has a significant and independent effect on the likelihood that individuals will vote: “even after controlling for variables that account for the motivation, information and resource levels of local precinct populations, we find that accessibility does make a significant difference to turnout.”²⁵ Haspel and Knotts (2005) followed a similar approach to Gimpel and Schuckecht, and studied whether the distance from an individual voter’s residence to a polling location affected turnout in the 2001 Atlanta mayoral election. Haspel and Knotts report that voting is sensitive to distance to the polling place, particularly for citizens who

²⁵ Gimpel, J G, and J E Schuknecht. 2003. “Political Participation and the Accessibility of the Ballot Box.” *Political Geography* 22(5): 471–88.

do not have access to a car. They find “small differences in distance from the polls can have a significant impact on voter turnout.”²⁶ They report that a change from the minimum distance of .01 mile to the median distance of .69 of a mile results in a 25% drop in the probability of voting among those without access to a vehicle. For voters with access to cars, the effect is smaller but still significant – a drop of 5% in the probability of voting. (2005, p. 568)

27. Brady and McNulty studied precinct consolidation in Los Angeles County in 2003 and confirm these past findings about distance and the negative impact on turnout: “[t]he change in polling place location has two effects: a transportation effect resulting from the change in distance to the polling place and a search effect resulting from the information required to find a new polling place”.²⁷ Brady and McNulty find that an increase of just .4 miles in the distance to polling places reduce the probability of polling place voting by 4% (p. 124).
28. The uniform hours requirement for early in-person voting locations that is currently in place in North Carolina will only make it more difficult for election administrators to operate the additional in-person voting locations needed to meet voter demand. The standard hours law removes the ability of local boards to open any early voting location for fewer than 12 hours on weekday and removes the ability of local boards to open any early voting location on some, but not all, weekdays during the early voting period. The impact of the law is to increase the costs of operating each additional early voting location, compared to what additional locations would cost to operate in prior

²⁶ Haspel, Moshe, and H Gibbs Knotts. 2005. “Location, Location, Location: Precinct Placement and the Costs of Voting.” *Journal of Politics* 67(2): 560–73.

²⁷ Pg. 116 of Brady, Henry E., and John E. McNulty. 2011. “Turning Out to Vote: The Costs of Finding and Getting to the Polling Place.” *American Political Science Review* 105(01): 115–34.

elections, when such restrictions were not in place. In prior years, a local board may judge that shorter operating hours and days in some locations were sufficient to serve the voters in their county. Under the uniform hours law, county boards have little flexibility if they wish to open additional locations. The consequence is that many counties chose to reduce the number of in-person locations for early voting, increased the distance that many voters had to travel, and in all likelihood, increased lines and reduced turnout.

29. A comparison of the 2014 midterm election and 2018 midterm election in North Carolina (the first general election under the standard hours requirement) shows that counties decreased access to early voting in several significant ways. First, 42 counties reduced the number of satellite early voting locations in 2018 compared to 2014, and only 9 counties increased the number of early voting locations. Second, more counties chose not to offer any satellite early voting sites at all and instead conducted all early voting at the county board of elections office. In 2014, 77 of 100 North Carolina counties offered more than the mandated single early voting location. In 2018, a higher turnout election, only 65 of 100 counties offered more than the mandated single early voting location. Third, counties reduced access to early voting on the weekend; 47 counties reduced the number of weekend days in comparison to 2014 and 65 counties reduced total weekend voting hours. These reductions occurred even though there were more weekend days available for counties to use for early voting in 2018 than in 2014.²⁸
30. Finally, election administrators will need to staff polling places with

²⁸ Calculations made by the author, based on One-Stop Voting Sites for the 2018 and 2014 elections, downloaded from the North Carolina Board of Elections FTP site, https://dl.ncsbe.gov/?prefix=One-Stop_Early_Voting/.

temporary poll workers. Poll workers require legal and procedural training, and poorly trained poll workers can negatively impact the trust and confidence that voters have in election outcomes.²⁹

31. During the 2016 election, the Election Assistance Commission (EAC) reported that 917,694 poll workers were needed nationwide. Nearly 65% of jurisdictions reported that it was either “very difficult” or “somewhat difficult” to obtain sufficient poll workers. The poll worker population skews toward older Americans – of the jurisdictions that reported to the EAC, 54% of poll workers were older than 60, and 58.3% of North Carolina’s poll workers were over 60, 24% of poll workers nationwide and 23.1% of North Carolina poll workers were over 70.³⁰ Between one-quarter and half of the poll worker workforce are squarely in a high-risk category for risk from COVID-19 solely due to age, according to the Centers for Disease Control and Prevention,³¹ and many of these individuals have expressed an unwillingness to serve as a poll worker under current conditions.³²
32. Karen Brinson Bell, The Executive Director of the North Carolina Board of Elections, wrote on April 22, 2020 that the procurement process for supplies and training materials needed to have begun

²⁹ Bridgett A. King, 2019, “Descriptive Representation in Election Administration: Poll Workers and Voter Confidence.” *Election Law Journal* 18(1): 16-30; Thad Hall, J. Quin Monson, and Kelly D. Patterson, 2007, “Poll workers and the vitality of democracy: An early assessment.” *PS: Political Science and Politics*. 40(4): 647-654.

³⁰ Election Assistance Commission, November 15, 2017, “EAVS Deep Dive: Poll Workers and Polling Places.” <https://www.eac.gov/documents/2017/11/15/eavs-deep-dive-poll-workers-and-polling-places>. Accessed May 25, 2020.

³¹ Centers for Disease Control and Prevention, “People Who Are At Higher Risk for Severe Illness.” <https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/people-at-higher-risk.html>. Accessed June 1, 2020.

³² Amy Gardner and Elise Viebeck. March 15, 2020. “Intensifying coronavirus fears rattle voters and elections officials in advance of Tuesday primary.” *Washington Post*. https://www.washingtonpost.com/politics/intensifying-coronavirus-fears-rattle-voters-and-elections-officials-in-advance-of-tuesday-primaries/2020/03/15/426c8762-66d3-11ea-abef-020f086a3fab_story.html. Accessed May 26, 2020.

immediately, and that many of the orders for preparing November general election materials need to be finalized by June 15.³³ This accords with deadlines identified by the Brennan Center for Justice on May 11, 2020, which stated that critical purchasing and planning decisions for a safe November elections needed to be made “in a matter of weeks.”³⁴

33. In addition to precinct consolidation, in light of SB 683’s prohibitions on assistance,³⁵ many voters who would like to vote by mail in order to protect themselves from infection from Covid-19 may be forced to vote in-person, thus further increasing the need for adequate numbers of in-person voting sites.
34. In summary, COVID-19 will require North Carolina election administrators to prepare for safe in-person voting in November. Existing polling places will require sanitizing measures and other protections. Administrators will need to either identify additional polling locations or select new locations to consolidate precincts. Local administrators will need to search more broadly for poll workers among younger segments of the population. These adjustments will take time, planning, and resources.

B. Voting By Mail

35. The Executive Director of the North Carolina Board of Elections projects a seven- to ten-fold increase in demand for vote by mail ballots in the state as a result of the COVID-19 pandemic.³⁶ The

³³ Letter from Executive Director Karen Brinson Bell, NC State Board of Elections, to Governor Roy Cooper and the General Assembly, dated April 22, 2020, provided to this expert.

³⁴ Edgardo Cortes et al., May 11, 2020, “Preparing for Election Day: Deadlines for Running a Safe Election.” Brennan Center for Justice. <https://www.brennancenter.org/our-work/research-reports/preparing-election-day-deadlines-running-safe-election>. Accessed June 2, 2020.

³⁵ N.C.G.S. 163-230.2

³⁶ Letter from Executive Director Karen Brinson Bell, NC State Board of Elections, to Governor Roy Cooper and the General Assembly, dated April 22, 2020, provided to this expert.

current election system as configured is unable to handle a dramatic increase in the demand for mail ballots. Steps that need to be taken include securing vendor relationships to print sufficient numbers of ballots, envelopes, and other materials; coordinating with local United States Postal Service operations to assure secure delivery and return of election materials; providing accessible options for voters who require assistive technology; obtaining ballot processing, sorting, and verification equipment; and developing and training appropriate staff in signature verification and other ballot handling procedures. Secure and accessible ballot drop off locations need to be identified.³⁷

36. Optimally, according to the National Vote at Home Institute, steps needed to implement and expand mail voting options should have begun in April to prepare for the November 2020 election.³⁸ Many other legal and administrative decisions ideally would be made in June, 2020, according to the Election Assistance Commission's Vote by Mail Project Timeline.³⁹
37. One point of law that will further overextend the North Carolina Board of Election's capacity to deal with an increased inflow of absentee ballots is the lack of any curing process for rejected absentee ballots.⁴⁰ Providing an option for voters to "cure" a ballot that arrives with a missing or unverifiable signature is recommended as a best practice by the Cybersecurity and Infrastructure Security Agency (CISA) Elections Infrastructure Government Coordinating Council's Joint

³⁷ Election Assistance Commission. "Voting by Mail / Absentee Voting." <https://www.eac.gov/election-officials/voting-by-mail-absentee-voting>. Accessed May 25, 2020.

³⁸ Vote At Home Institute, March 2020, "Vote at home scale plan." https://www.voteathome.org/wp-content/uploads/2020/03/VAHScale_StrategyPlan.pdf, accessed May 25, 2020.

³⁹ Election Assistance Commission, "Vote by Mail / Absentee Voting Timeline." <https://www.eac.gov/sites/default/files/electionofficials/vbm/VBMProjectTimeline.pdf>. Accessed May 25, 2020.

⁴⁰ See Figure 5 for information on the percentage of ballots North Carolina rejected from 2014-2018

COVID Working Group⁴¹ and the Center for Civic Design.⁴² Escambia County, Florida reported a 70% drop in rejected ballots in the 2016 election, compared to the 2012 election, after a cure process was put in place for missing signatures.⁴³ If county boards have to resend absentee ballots to voters who incorrectly executed their absentee ballots, it will add more pressure on the county board's ability to efficiently and effectively execute a robust vote-by-mail program.

38. Finally, it remains unclear how it is possible to honor the two-witness requirement in North Carolina given the requirements for social distancing. Only 12 states currently have a witness requirement, and only three have a two-witness requirement.⁴⁴ Two of those twelve states—Virginia and South Carolina—have changed their witness requirements for casting an absentee ballot in the June Primary, in light of Covid-19.⁴⁵

C. Evidence From Administering Recent Elections

39. At the time of the submission of this report, sixteen states have chosen to postpone scheduled primaries or caucuses or have chosen to conduct an all-mail primary in response to the pandemic.⁴⁶ The recent

⁴¹ CISA #PROTECT2020 Resource page is available at <https://www.cisa.gov/protect2020>, and the document recommending signature curing is

https://www.eac.gov/sites/default/files/electionofficials/vbm/Signature_Verification_Cure_Process.pdf.

⁴² Center for Civic Design, "Voting from Home: Scaling Up in 2020." <https://civicdesign.org/wp-content/uploads/2020/04/CCD-Guide-to-mail-voting-4-10.pdf>. Accessed June 3, 2020.

⁴³ Center for Civic Design, "Counting more absentee ballots in Escambia County, Florida." <https://civicdesign.org/showcase/counting-more-absentee-ballots-in-escambia-county-florida/>. Accessed June 3, 2020.

⁴⁴ National Conference of State Legislatures, 1/21/2020, "Verification of Absentee Ballots," <https://www.ncsl.org/research/elections-and-campaigns/verification-of-absentee-ballots.aspx>. Accessed June 2, 2020.

⁴⁵ Absentee Ballot Requirements, Virginia State Board of Elections, <https://www.elections.virginia.gov/casting-a-ballot/absentee-voting/>. Accessed June 2, 2020; *Thomas v. Andino*, --- F.Supp.3d ---- (D.S.C. 2020).

⁴⁶ Nick Corasaniti and Stephanie Saul, May 22, 2020, "16 states have postponed primaries during the pandemic. Here's the list." *New York Times*. <https://www.nytimes.com/article/2020-campaign-primary-calendar-coronavirus.html>. Accessed May 22, 2020.

experience of one state, Wisconsin, provides predictive evidence of how COVID-19 will impact North Carolina in November 2020, and the appropriate actions that the state will need to make to administer a safe, secure, and accessible election. Like North Carolina, Wisconsin is a “mostly polling place” state, with less than five percent of its ballots cast by mail in 2018, even though the state requires no excuse for casting an absentee ballot.

40. Wisconsin chose to hold an in-person primary on April 7, 2020. Wisconsin is the best available example of the kinds of adjustments that election administrators will have to make to prepare for in-person voting during the pandemic, and how a short timeline and limited resources may create long lines and restrict access to the polls.

41. The Wisconsin Elections Commission (WEC) recognized the challenges the pandemic posed to the primary. In a March 18, 2020, update to the WEC⁴⁷, the commission’s administrator reported:

“The lack of available hand sanitizer and other sanitation products has emerged as one of the key concerns of clerks and election inspectors, a large percentage of whom are in the age range of higher vulnerability.”

“Commission staff has advised clerks to implement any contingency plan they have regarding alternative polling locations in case of an emergency. When considering alternatives, clerks should attempt to find locations that are accessible to individuals with disabilities and large enough to serve their community while practicing as much social distancing as possible.”

42. The impact of these challenges on in-person voting became evident during early in-person and Election Day voting.

⁴⁷ Meagan Wolfe, March 18, 2020, “Update Regarding COVID-19 Election Planning.” Memo written to the Wisconsin Election Commission. Accessed at https://elections.wi.gov/sites/elections.wi.gov/files/2020-03/Com_._%20memo%20re%20COVID-19%20Election%20Planning%203.18.20.pdf

43. The first impact of COVID-19 in the Wisconsin primary was the reduction of sites for early in-person and Election Day voting. A number of local jurisdictions in Wisconsin were forced to severely limit or close all in-person early voting locations because of inadequate staffing and insufficient supplies of personal protective equipment for election workers and voters.⁴⁸ The City of Milwaukee, which normally provides 180 Election Day polling locations, provided only 5 in the April 7, 2020, primary.
44. The reduction was highly uneven in the metropolitan area, as shown on the map in Figure 5.⁴⁹ In wealthier, whiter suburban areas, there were limited reductions. But in the lower-income, heavily African-American urban core, only five in-person locations were available on Election Day. Similarly, the City of Green Bay offered only 2 polling locations instead of the normal 31.

⁴⁸ Laurel White, March 23, 2020, "Election Officials Across Wisconsin Eliminate, Scale Back In-Person Early Voting," Wisconsin Public Radio. <https://www.wpr.org/election-officials-across-wisconsin-eliminate-scale-back-person-early-voting> Accessed May 20, 2020.

⁴⁹ Source: John A. Curiel, Research Scientist, MIT Elections Data and Science Lab. Healthy Elections Project data repository, https://github.com/MEDSL/healthy_elections/tree/master/WI, accessed May 25, 2020.

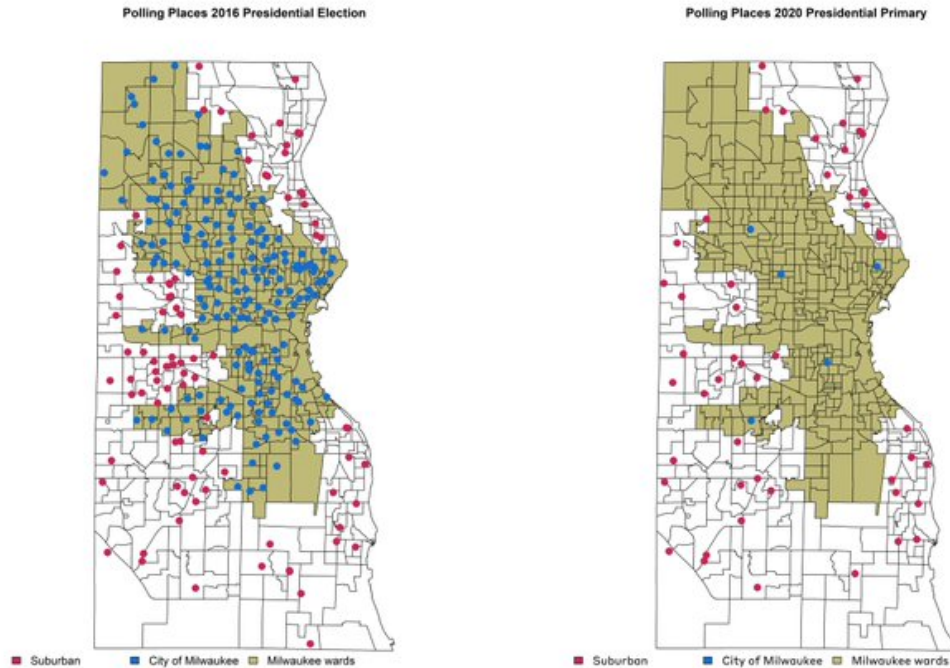


Figure 5: Election Day Polling Locations in Milwaukee, WI in the 2016 and 2020 Presidential Primaries (City of Milwaukee boundaries colored in green; polling locations in red [suburban] and blue [city].)

45. On June 2, 2020, Pennsylvania had its primary and many counties and cities had to consolidate their polling places. Philadelphia cut its polling places by more than 60%, to 190 polling places, down from 831 polling places that they had in the November 2019 Municipal Election.⁵⁰ Many officials in the state describe encountered difficulties in finding alternative polling locations because of “restrictions on large public venues that have historically served as

⁵⁰ Michael Tanenbaum, May 13, 2020, “Philly plans sharp reduction of polling places for June 2 primary election” Philly Voice. <https://www.phillyvoice.com/philly-polling-places-primary-election-june-2-2020-poll-workers-mail-in-absentee-ballot/>. Accessed June 3, 2020.

polling places, such as schools, libraries, and municipal buildings.”⁵¹

46. The second impact of COVID-19 was the increase in lines. As a consequence of the reduction of locations, there were excessively long lines at some of the remaining locations where reductions had occurred. Voters waited two to three hours to cast a ballot in Milwaukee, Green Bay, and in other locations.⁵²
47. The third impact of COVID-19 was the increase in the number of absentee ballots requests by over 500 percent. There were 1,303,985 absentee ballots requested for the April 7, 2020 primary and 1,159,800 absentee ballots were returned and counted.⁵³ It was a 5:1 ratio of mail-in to in-person absentee ballots. In the April 2016 primary, 247,052 absentee ballots were requested and 212,832 were returned and counted.⁵⁴ The number of requests represented a 527% increase when compared to the April 2016 primary. The percentage of absentee ballots cast by mail in the 2016 primary was 8.1% of the total ballots cast, and the percentage of absentee ballots cast by mail in the 2020 primary was an unprecedented 61.8% of all ballots cast.⁵⁵
48. It is important to note that even under the April 7, 2020, conditions of the pandemic, with an essentially uncontested presidential primary

⁵¹ Ivey De-Jesus. April 28, 2020. “As counties look to consolidate polling places, advocates worry about voter disenfranchisement.” *Harrisburg Patriot-News / Penn-Live*. <https://www.pennlive.com/coronavirus/2020/04/as-counties-look-to-consolidate-polling-places-advocates-worry-about-voter-disenfranchisement.html> Accessed May 20, 2020.

⁵² New York Times, April 7, 2020, “Wisconsin Primary Recap: Voters Forced To Choose Between Their Health and Their Civic Duty.” <https://www.nytimes.com/2020/04/07/us/politics/wisconsin-primary-election.html> Accessed May 20, 2020.

⁵³ Wisconsin Elections Commission, Absentee Ballot Report. May 15, 2020. “April 7, 2020 Absentee Voting Report.” <https://elections.wi.gov/sites/elections.wi.gov/files/2020-05/April%202020%20Absentee%20Voting%20Report.pdf>

⁵⁴ 2016 totals calculated by the author from the Wisconsin Board of Elections “2016 Presidential Preference and Spring Election GAB-190F: Election Voting and Registration Statistics Report”, downloaded from <https://elections.wi.gov/publications/statistics/gab-190/2016-spring-election-presidential-primary>

⁵⁵ Wisconsin Elections Commission, Pg. 6, <https://elections.wi.gov/sites/elections.wi.gov/files/2020-05/April%202020%20Absentee%20Voting%20Report.pdf>

and a competitive State Supreme Court race, over 25% of Wisconsin voters chose to vote in person on Election Day and 12.6% chose to cast an in-person absentee ballot, as shown in Figure 6.⁵⁶ Even with a pandemic in full force, over 37% of Wisconsin's voters still opted to cast an in-person ballot. This provides predictive evidence that a substantial portion of North Carolina's voters will want to cast an in-person ballot in the November 3, 2020 general election given the similarities between the two states and the number of people who vote in-person.

Table 4.

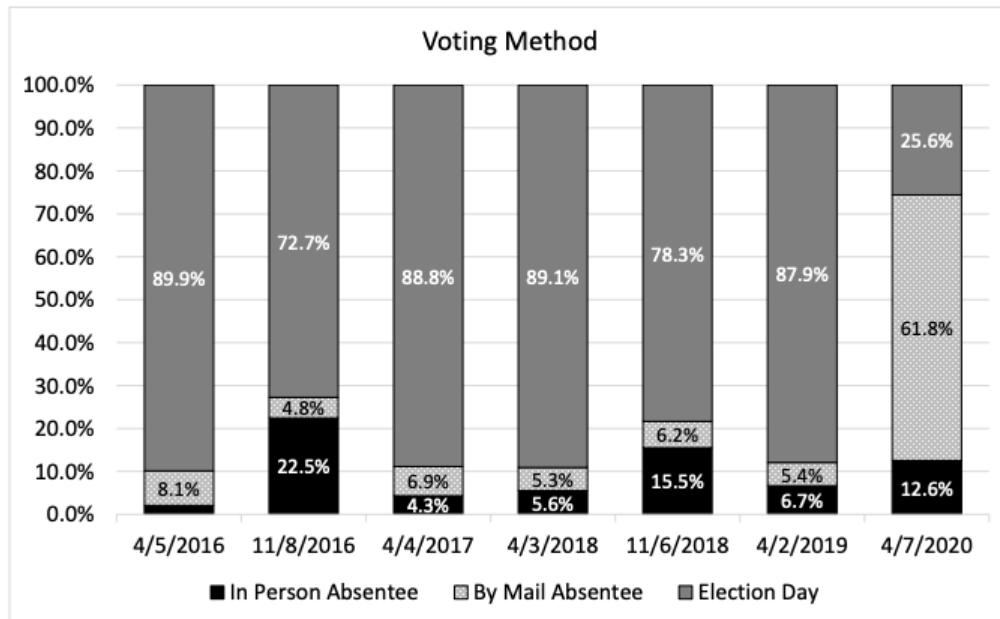


Figure 6: Comparison of Voting Methods in Wisconsin, April 2016-April 2020

⁵⁶ Wisconsin Elections Commission, May 15, 2020. "April 7, 2020 Absentee Voting Report #3.", pg. 6, <https://elections.wi.gov/sites/elections.wi.gov/files/2020-05/April%202020%20Absentee%20Voting%20Report.pdf>

49. Elections officials in Florida,⁵⁷ Ohio,⁵⁸ South Carolina,⁵⁹ and multiple other states have reported difficulties finding sufficient poll workers, having poll workers drop out, and facing other challenges in preparing to conduct elections during the pandemic.⁶⁰ Several thousand absentee ballots never made it to Wisconsin voters.⁶¹ Other states have had the same experience. During the April 28th primary in Ohio, one estimate is that “thousands” of Ohioans never got their ballots by the April 28th deadline.⁶² The June 2nd primary in the District of Columbia resulted in long lines due to a reduction in polling places. One-third of those voters who were interviewed said they had to vote in-person because their absentee ballots did not arrive in time.⁶³
50. The experiences of Wisconsin, Pennsylvania, and other states provide evidence that North Carolina will want to prepare as soon as possible and provide flexibility in selecting alternative voting locations and in recruiting poll workers for the November 3, 2020, election. The state should also expand the options for requesting absentee ballots beyond

⁵⁷ Andrew O'Reilly. March 12, 2020. “Coronavirus fears cause poll worker dropouts, safety concerns ahead of Florida primary”. Fox News. <https://www.foxnews.com/politics/coronavirus-poll-worker-florida> Accessed May 25, 2020.

⁵⁸ Julia Harte, March 13, 2020, “Exclusive: Fewer poll workers, coronavirus, spark fears of election day woes in Ohio Democratic primary”, Reuters, <https://www.reuters.com/article/us-usa-election-ohio-exclusive/exclusive-fewer-poll-workers-coronavirus-spark-fears-of-election-day-woes-in-ohio-democratic-primary-idUSKBN210328>. Accessed May 26, 2020.

⁵⁹ Bristow Marchant, April 29, 2020, “Richland County is losing hundreds of June primary poll workers to coronavirus fears,” *The State* <https://www.thestate.com/news/politics-government/election/article242381961.html>

⁶⁰ Pam Fessler, March 2, 2020, “Coronavirus and Super Tuesday Voting: It’s Touchy.” National Public Radio, <https://www.npr.org/2020/03/02/811323562/coronavirus-and-super-tuesday-voting-its-touchy>, Accessed May 26, 2020.

⁶¹ Nick Corasaniti and Stephanie Saul, April 9, 2020, “Inside Wisconsin’s Election Mess: Thousands of Missing or Nullified Ballots.” *New York Times* <https://www.nytimes.com/2020/04/09/us/politics/wisconsin-election-absentee-coronavirus.html>. Accessed June 2, 2020.

⁶² Darrel Rowland and Rick Rouan. April 28, 2020. “After a problem-plagued primary, Ohio leaders disagree about a November election plan.” *Columbus Dispatch*. <https://www.dispatch.com/news/20200428/after-problem-plagued-primary-ohio-leaders-disagree-about-november-election-plan>. Accessed June 3, 2020.

⁶³ Julie Sauzmer and Genir Nirappit. June 3, 2020. “Bowser ally Brandon Todd loses D.C. Council primary to left-leaning challenger; Evans far behind in Ward 2 race.” *Washington Post*. https://www.washingtonpost.com/local/dc-politics/tuesday-is-election-day-in-dc-though-much-of-the-voting-has-already-happened/2020/06/01/f9738568-a437-11ea-b619-3f9133bbb482_story.html. Accessed June 3, 2020.

a mail-only option in order to reduce pressure on early in-person and Election Day polling places. Additionally, the uniform hours requirement for early in-person satellite locations should also be lifted so as to provide more flexibility for county boards in securing locations and offering early voting options to their residents. Additionally, the state should relax the requirement that a majority of poll workers live in a precinct so as to expand the recruitment pool.

III. The Impact of the COVID-19 Pandemic On North Carolina's 2020 General Election

A. The Pandemic's Effect on Voter Preferences

51. The pandemic will likely cause a substantial increase in voting by mail in North Carolina. At the same time, due to historical voting patterns within the State, a significant number of North Carolina voters will continue to vote in person.
52. An April 2020 poll conducted by the Pew Research Center reported that two-thirds of Americans expect some disruption of the November 2020 election due to the pandemic. Seventy percent of the respondents favor allowing any voter to vote by mail if the voters wants to.⁶⁴
53. A May 2020 national poll conducted by a university consortium found that 60% of respondents supported making voting by mail easier, and 36% said that they would be more likely to vote if they had the option to vote by mail. However, 44% of respondents under 25 said they were not confident that they understood the process of voting by mail, and 40% of respondents aged 25 to 44 also said they were not confident

⁶⁴ Carroll Doherty, Jocelyn Kiley, and Nida Ascher. April, 2020. "Two-Thirds of Americans Expect Presidential Election Will Be Disrupted by COVID-19." Report of the Pew Research Center, Washington DC. <https://www.people-press.org/2020/04/28/two-thirds-of-americans-expect-presidential-election-will-be-disrupted-by-covid-19/>.

about the mail voting process.⁶⁵ This survey also indicates that a significant number of respondents will vote as they always have, using the in-person method.

54. Evidence from the Wisconsin primary and other recent primaries shows that while there is likely to be a dramatic surge in requests for absentee ballots in November, particularly in a state like North Carolina that does not require an excuse. But, there will also be substantial numbers of voters who will continue to want to cast a ballot in-person, either early or on Election Day.
55. As noted above, because of the increase in the number of absentee ballot requests in Wisconsin, many voters never received their absentee ballots by election day despite timely requesting them.⁶⁶ Absentee ballots arriving late, or not arriving at all, had been an issue for UOCAVA voters for many years, as the Pew Center on the States documented in the “No Time To Vote” report, and the Federal Write-In Ballot⁶⁷ serves as a fail-safe option for these voters.⁶⁸ The Federal Write-In Ballot is already familiar to election officials. Therefore, it will be important for North Carolina to offer a fail-safe option for voting such as the Federal Write-In Ballot if the State’s capacity to execute a more robust mail-in voting program falters.
56. Research shows that voters habituate to a particular way of voting due to “behavioral repetition.”⁶⁹ Even though convenience voting

⁶⁵ Covidstates.org. May 22, 2020, “The State of the Nation: A 50-State COVID-19 Survey: Report 3 .”

⁶⁶ Carrie Levine, *Ohio’s Mail-in Ballot Brouhaha: A Sign of Coming Trouble?* The Ctr. For Public Integrity (Apr. 28, 2020), <https://publicintegrity.org/politics/elections/ohios-mail-in-ballot-brouhaha-a-sign-of-coming-trouble/> (mentioning Wisconsin’s absentee voting issues)

⁶⁷ 52 U.S.C. § 20303

⁶⁸ Pew Center on the State, January 2009, “No Time To Vote: Challenges Facing America’s Overseas Military Voters.” Washington, DC: Pew Center on the States.

⁶⁹ John Aldrich et al, 2011, “Turnout as a habit,” *Political Behavior* 33: 535-563.

methods (early in-person, no-excuse absentee) have expanded across the country, millions of citizens continue to vote on Election Day due to this habituation.⁷⁰ As shown in Figure 4 above, approximately half of North Carolina voters continued to vote on Election Day in 2018.

B. Challenges in Ensuring a Safe Election in North Carolina

57. Seven county boards in North Carolina have already obtained approval for precinct consolidations for the June 23, 2020, primary and one additional county request is pending. Consolidations were requested because locations that were previously used are now inaccessible; in order to assure sufficient space for social distancing; in order to assure poll worker safety; and to adjust to the lower demand for Election Day voting. Forty-six polling places have been eliminated through consolidation, and another 18 are pending elimination.⁷¹ Counties will need to begin this process as soon as possible so that voters understand their newly assigned polling places. If this process is not started early enough, as shown in prior research, consolidation can adversely impact some voters and lower voter turnout.
58. County boards will also need sufficient time to be able to recruit poll workers. Statewide, as shown in Figure 7, 58.3% of poll workers in North Carolina in the 2016 election were over 61, with substantial variation across counties. 23.1% of poll workers were 71 or older in the state, as shown in Figure 8. The experience of other states conducting primaries indicates that a substantial number of these

⁷⁰ Brian Amos, Daniel Smith, and Casey Ste. Claire.2016. "Reprecincting and Voting Behavior." *Political Behavior* 39: 133-156.

⁷¹ The counties are Buncombe, Jackson, Macon, Madison, Mitchell, Transylvania, and Yancey. Haywood County request is pending as the time of this writing. Source: NC Board of Elections, https://dl.ncsbe.gov/index.html?prefix=Public_Records_Requests/June%2023%20Second%20Primary_temporary_precinct_transfers

workers may decline to work on Election Day.

Poll Workers Aged 61 and Older in North Carolina in the 2016 Election, by County
Source: Election Administration and Voting Survey

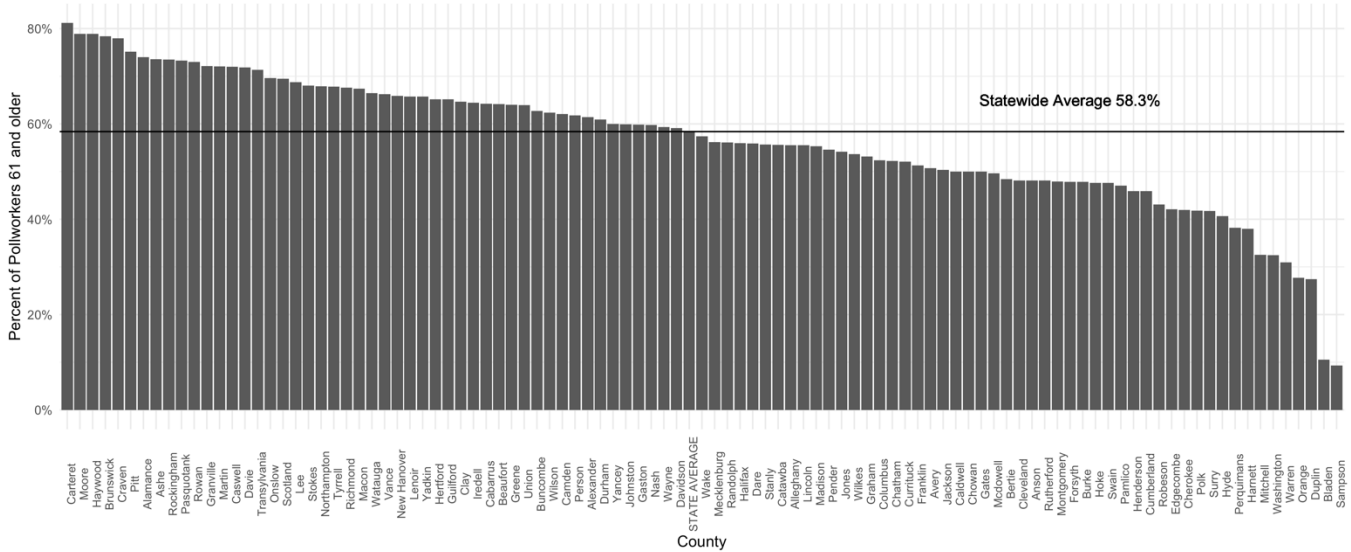


Figure 7: Poll workers Over 61 in North Carolina in 2016.

Poll Workers Aged 71 and Older in North Carolina in the 2016 Election, by County
Source: Election Administration and Voting Survey

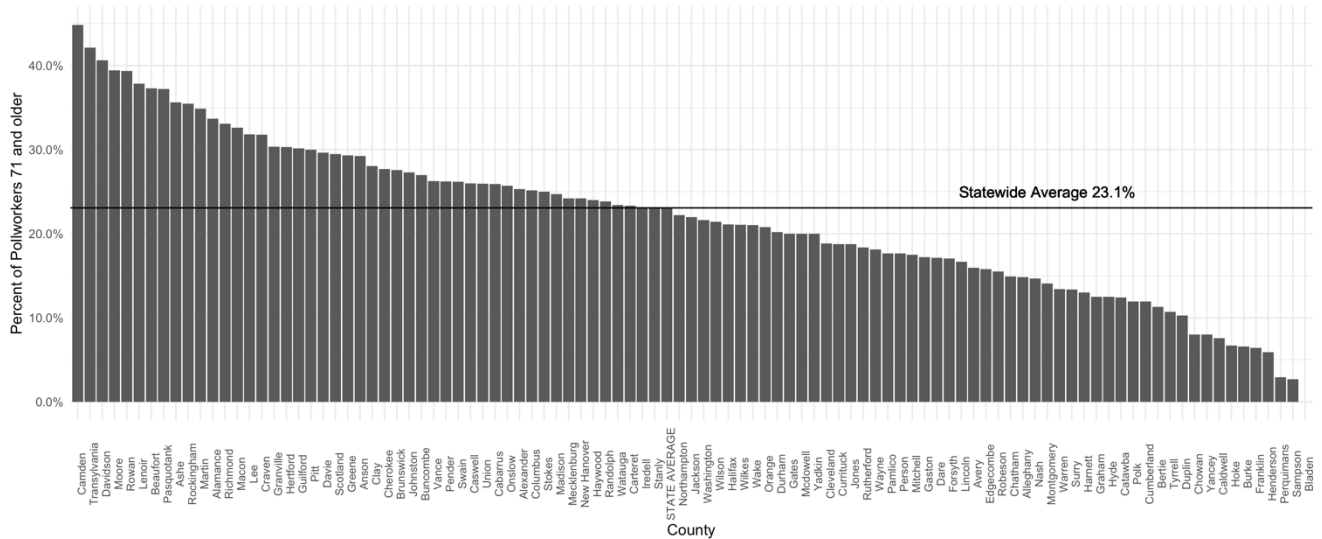


Figure 8: Poll workers over 71 in North Carolina in 2016

59. Recruitment of replacement workers will be difficult across the state, but particularly in counties that fall on the left hand side of Figure 7 and Figure 8 because of the requirement that a majority of the poll

workers resides in the precinct where they wish to serve.⁷² North Carolina is one of only eleven states that place precinct residency restrictions on poll workers, and six of the eleven states that retain these restrictions conduct elections at the township or municipality level.⁷³ Only five states that conduct elections at the county level, like North Carolina, place precinct residency restrictions on poll workers.⁷⁴

60. **Recommendations**

County boards should immediately identify sufficient in-person voting locations for early voting and precinct place voting, and require this information publicly at the earliest possible instance. The uniform hours requirement for satellite early in-person voting locations should also be suspended, so that County Boards can provide more in-person voting locations. The requirement that a majority of Election Day poll workers reside within an election precinct is also unnecessarily burdensome and is a requirement in very few states. If were relaxed, it will allow County boards more latitude to recruit sufficient Election Day poll workers to staff precinct place voting locations. Additionally, the state should allow for electronic requests of absentee ballots, suspend the requirement for two witness signatures on the returned ballot materials, and develop a fail-safe absentee voting method or allow all eligible voters to use the Federal Write-In Absentee Ballot, as a way to meet the demand for by-mail balloting and accommodate those citizens who feel unsafe at in-person voting. Finally, each county board should have sufficient time and resources to implement

⁷² Source: North Carolina Board of Elections <https://www.ncsbe.gov/get-involved> and NC Revised Statutes 163-41.

⁷³ John Aldrich et al, 2011, "Turnout as a habit," *Political Behavior* 33: 535-563.

⁷⁴ Totals were calculated by the author from the Federal Election Assistance Commission, May 2016, "State by State Compendium: Election Worker Laws and Statutes." https://www.eac.gov/sites/default/files/eac_assets/1/28/Compendium.2016.pdf, accessed June 2, 2020.

these changes.

VI. Conclusion

61. The COVID-19 pandemic has impacted nearly every aspect of American life, and elections are no exception. Elections and election administration are, in fact, traditionally a high-touch, face-to-face process. Even with the increased adoption of convenience voting methods by the states, millions of Americans continue to opt to vote in person on Election Day. Numerous expert commissions recommend that states prepare for a dramatic increase in mail voting in November 2020, but also maintain sufficient access to in-person voting.
62. My expert evaluation of the evidence is that North Carolina is likely to experience a substantial increase in the use of mail balloting in the November 3, 2020, election, but the state's election administration system is currently designed around in-person voting and citizens are habituated to that method. Many will continue to vote in person in November.
63. County boards must begin to prepare immediately to assure a safe, secure, and accessible election. Early in-person voting should be maintained and where possible increased, by suspending the uniform hours requirement. Precinct consolidations, if necessary, must be done with care, using the best tools available to assure that consolidation is done fairly and equitably, without respect to age, race, income, disability, or other status. Consolidations must be completed and announced in enough time so that election officials, candidates, political parties, and other organizations can communicate this information to voters.
64. County boards should not be constrained to precinct residents when

recruiting poll workers during this election. The typical poll worker is over 60 years old, with nearly a quarter over 70. In a number of counties, more an three-quarters of their poll workers were over 61 in 2016. Artificial barriers to poll worker recruitment should be removed for this election.

I declare under penalty of perjury that the foregoing is true and correct.

Executed this 4th day of June, 2020.

A handwritten signature in black ink, appearing to read "Paul Gronke". The signature is fluid and cursive, with the first name "Paul" being more legible than the last name "Gronke".

Dr. Paul Gronke

Paul Gronke

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(503) 517-7393
gronke@reed.edu

EDUCATION

UNIVERSITY OF MICHIGAN <i>Doctor of Philosophy, Political Science</i>	Ann Arbor, MI December 1993
UNIVERSITY OF ESSEX <i>Master of Arts, Western European Politics</i>	Essex, UK June 1984
UNIVERSITY OF CHICAGO <i>Bachelor of Arts, Political Science, with honors</i>	Chicago, IL June 1982

EMPLOYMENT

REED COLLEGE <i>Professor of Political Science</i>	Portland, OR January 2001 – Present
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- Teach introductory and upper-level classes focusing on American politics, including elections, political behavior, political institutions and political research methods.
- Publish peer-reviewed articles, book chapters, and research reports.
- Research support from foundations, contracts, consultancies and internal competitive grants.
- Granted tenure in 2004; promoted to full professor in 2008.

APPALACHIAN STATE UNIVERSITY <i>Daniel B. German Endowed Visiting Professor of Political Science</i>	Boone, NC August 2014-May 2016
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- Inaugural holder of endowed visiting professorship.
- Teach research courses on elections, elections research, U.S. Congress, research methods.
- Lead departmental symposia and sponsor visiting lectures.

THE DEMOCRACY FUND <i>Strategic Consultant, Elections Program</i>	Washington, DC September 2015 – ongoing
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- Engaged in systems mapping and strategic planning for multiyear grant making and research initiative.
- Provide scientific and methodological evaluations of grantee requests and report.
- Connect the program to a network of academics with interests in election administration and reform.

PEW CHARITABLE TRUSTS <i>Consultant, Elections Initiatives of the Pew Center on the States</i>	Washington, DC September 2007 – November 2011
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- Provided empirical analysis and write reports for ongoing projects pertaining to election integrity and equity.
- Consulted on strategic initiatives, review grant proposals, provide methodological and substantive quality control review.
- Helped organize gatherings and conferences, manage inquiries from media and other stakeholders.

DUKE UNIVERSITY <i>Assistant Professor of Political Science</i>	Durham, NC September 1991 – December 2000
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- Taught undergraduate and graduate classes focusing on American politics, including public opinion, legislative behavior, political parties, and graduate statistical methods (first course). Received campus-wide teaching award in 1996.
- Published a university press book, peer-reviewed articles, and book chapters.

- Received research support from the National Science Foundation, the Ford Foundation, and internal grants.
- Instructor from September 1991-August 1993; Assistant Professor from September 1993-December 2000.

ADMINISTRATIVE POSITIONS

FOUNDER AND DIRECTOR

Reed College

Early Voting Information Center

2005-present

- Established a non-partisan center conducting research into and disseminating information about early in-person and absentee balloting.
- Manage public outreach, recruit and supervise 2-4 staff members (undergraduate and post-baccalaureate researchers), manage budgets, work to attract continuing external support.
- Raised more than \$750,000 in external support since 2005.

Co-EDITOR

Co-Editor, PS: Political Science and Politics

August 2014-present

- Appointed interim co-editor of flagship journal of the American Political Science Association, the world's largest scholarly society for political scientists.
- Tasked with modernizing content, determining new content delivery methods, engaging readership via social media, along with soliciting articles and conducting all other editorial duties.
- Helped to hire, train, and supervise a new managing editor.
- Reappointed by the APSA Council to a second four year term from 2018-2021.

EDITOR

Election Law Journal

2010-2017

- Responsible for reviewing incoming articles, hire and supervise an editorial assistant to assign reviewers and meet deadlines, and evaluating reviews and articles for acceptance or rejection.
- First social scientist chosen to co-edit the only peer-reviewed interdisciplinary journal covering election law, election administration, and election policy.
- Co-editor 2010-2013, primary editor 2014-present.

DEPARTMENT CHAIR

Reed College

Department of Political Science

2001-2004; 2005-2007; 2009-2010, 2012-2014

- Responsible for curricular planning, committee assignments, student progress toward degree, staff hiring and supervision, and other departmental governance for a five-member department and 30-40 majors (juniors and seniors).
- Successfully expanded faculty from 4 to 7 members; worked with department and college to update and reform department requirements and curriculum; doubled departmental majors and expanded class enrollments.
- Budgetary planning and management of a \$23,000 department budget and seven endowed funds with annual income exceeding \$70,000.
- With Economics Department, responsible for campus-wide student-faculty summer research program, 3-5 awards each summer.

DIRECTOR

Reed College

Public Policy Lecture Series

2001-2006, 2008-2011, 2012-14, Fall 2016

- Created a campus wide lecture series to bring nationally and internationally recognized speakers on domestic and international affairs to campus. Identify important areas of public and campus concern; identify potential speakers; and collaborate on public outreach.
- Empowered students by creating a student coordinating committee; continue to work with student committee to manage series; create student-run events with each speaker.

- Manage \$20,000 annual lecture series budget; hire and manage part-time lecture coordinator.

DIRECTOR

Reed College

Public Policy Workshop

2001-02, 2005-present

- Maintain a divisional student research and thesis writing workspace (6 workstations, group meeting space, computer projection).
- Responsible for hiring and supervising part-time facility manager, coordinating with divisional members to assure identifying new computational and statistical needs for students and faculty, and assuring continuing support from the College.

OTHER GOVERNANCE ACTIVITIES

Co-CHAIR

2017-2018

Ad Hoc Committee on Governance

- Lead an effort to improve faculty meetings, propose changes to faculty elections, evaluate the structure of the Dean's Office and reform major governance committees in order to reinvigorate faculty governance.
- Appointed by the President of the College.

MEMBER

Foundational Curriculum Working Group, Reed College Strategic Planning

2013-2014

- Responsible for analyzing materials, soliciting community feedback, and writing a working group report about Reed's first year curriculum as part of the College wide strategic planning process.
- Selected by Dean of the Faculty.

MEMBER

Dean of the College Search Committee, Reed College

2009-2010

- Responsible for working with President and committee to write a job description, identify candidates, evaluate nominations, and build consensus among the President, Committee on Advancement and Tenure, and the campus community to select a candidate.
- Selected as committee secretary.
- Chosen for membership by Committee on Advancement and Tenure and President of the College.

MEMBER

Committee on Academic Policy and Planning, Reed College

2006-2007

- Elected as a member of the primary faculty governance committee.
- Responsible for long-range strategic planning, reviewing major college curricular initiatives and monitoring ongoing curricular matters, overseeing and reviewing departmental self-evaluations, and allocating tenure track and visiting faculty positions.

MEMBER

Ad Hoc Committee on Environmental Studies, Reed College

2004-2006

- Responsible for evaluating the feasibility of a major new interdisciplinary program.
- Worked with external review committee to evaluate program proposal and review recommendations.
- Helped build campus consensus for a new program, which successfully passed faculty in 2008.

GRANTS, CONTRACTS, AND CONSULTANCIES

EXTERNAL COMPETITIVE GRANTS

National Science Foundation. Award #1727458 "Election Sciences Workshop." June 15, 2017-November 30, 2018.

Awarded in collaboration with Portland State University (#1727461). Total award: \$49,783.

Federal Voting Assistance Program. "Trend Analysis in UOCAVA Voting." September 2012-August 2013. \$90,000.

Pew Charitable Trusts. "Diagnosing Residual Voting: A Comprehensive Approach." October 2007-August 2009. \$137,000. With Kimball Brace and Charles Stewart.

Carnegie Foundation of New York. "Extending the Election Day Survey." June-December, 2006. \$17,000. (Matching funds from AEI/Brookings Election Reform Project: \$4000).

Mellon Foundation, Summer Faculty Research Grant, "The Early Voting Information Center." Summer 2005. \$8000.

Mellon Foundation: Summer Teaching Conference "Integrating Quantitative Methods in Social Science Classes." Summer 2005. \$12,000.

National Science Foundation Research Experiences for Undergraduates (REU) Program Award, \$5000, July 1999-June 2000.

National Science Foundation. "Consensus, Volatility, and Uncertainty in Presidential Approval." May 1, 1998-April 20, 2000. \$20,000.

"Governing a Volatile Public." Howard Foundation Fellowship (December, 1996). Awarded honorable mention.

Ford Foundation Course Development Grant, "The Internet and Political Participation," Spring 2000 (\$5000).

Ford Foundation Grants for Undergraduate Mentoring in Political Science (1998-2000, \$3000, with Carrie Liken; 1996-1998, \$3000, with Kelly Jade Davis)

CONSULTANT AND CONTRACT WORK

State of Oregon, Division of Elections, PO-16500-405. "Oregon Elections Performance Audit." \$50,000. With Dr. R. Michael Alvarez, California Institute of Technology.

The Democracy Fund, Elections Program. Scientific Consultant to the Elections Team. September 2015-ongoing.

Federal Voting Assistance Program. "Survey Validation Study Contract HHSP233201200040C." Subcontractor for SBG Technology Solutions. January-August 2013.

Pew Center on the States, Elections Initiatives. "WEVOTE: A Web-Based Early Voting Optimization Tool." Awarded to Reed College and EVIC. Oct. 2010-March 2011. \$84,000.

Maryland Department of Legislative Services. Maryland Voting Systems Study. Subcontractor to the Research Triangle Institute. August 2010-December 2010. \$6500.

Pew Center on the States, Election Initiatives. Academic Consultant and Policy Advisor. Awarded to the Reed Institute and EVIC. September 2009-August 2010. \$130,290.

State of Oregon, Division of Elections. Implementation of Redistricting Utilizing the Oregon Centralized Voter Registration System (RFP #165-1045-09). Paul Gronke and EVIC were academic consultants to the Gartrell Group, Inc. (Primary contractor). October 2009-June 2010. \$25,000.

Pew Charitable Trusts. Quality Control and Validation Process. Reed Institute and EVIC. June 2009-August 2009. \$36,900.

Pew Charitable Trusts. Consultant and Policy Advisor to the Elections Initiative of the Pew Center on the States. Awarded to the Reed Institute and the Early Voting Information Center. September 2007-August 2009. \$206,000.

Election Assistance Commission. The 2008 election administration and voting survey. EVIC was a subcontractor to the Research Triangle Institute. \$32,500.

Election Assistance Commission. The 2006 election administration and voting survey data." Contract No. 1406-04-07-PO-67699. May-September 2007. \$186,825 total award; subcontract to Paul Gronke/EVIC for \$40,000.

EXPERT WITNESS WORK

League of Women Voters vs. The State of North Carolina, Civil Action No. 1:13-CV-660, 2014-2015
Ohio State Conference of the NAACP, et al. vs. John Husted, et al., Case No. 2:14-cv-00404, Summer 2014
State of Florida vs. The United States of America et al. Civil Action No. 11-1428. Summer 2012.

INTERNAL COMPETITIVE GRANTS

Corbett-Goldhammer Summer Collaborative Research Grant. "The Noisy Reaction: How Reductions in Early Voting Opportunities Impacts Citizen Enfranchisement." With Jacob Canter, Summer 2013.

Corbett-Goldhammer Summer Collaborative Research Grant. "American Anti-Muslim Attitudes." With Rebecca Traber, Summer 2011.

Corbett-Goldhammer Summer Collaborative Research Grant. "The Data for Democracy Report." With Bailey Schreiber, Summer 2008 (\$10,000).

Michael and Carole Levine Foundation. "Early Voting Reforms in America." \$10,500. 2007-08.

Corbett-Goldhammer Summer Collaborative Research Grant. "Trust but Verify collaborative writing project." With Avery Ucker, Summer 2006 (\$10,000).

Michael Levine Fund for Faculty Research, \$8,000 (2003-4).

Corbett-Goldhammer Summer Collaborative Research Grant. "Voting Early, Voting Smart? America's Experience with Early Voting." With Peter Miller. Summer 2004 (\$10,000).

Corbett-Goldhammer Summer Collaborative Research Grant: "Building a Cross-Sectional Time Series Dataset for Presidential Approval Research." With Joshua Simon. Summer 2003 (\$10,000).

Corbett-Goldhammer Summer Collaborative Research Grant. "Disdaining the News: Changing Public Attitudes Towards the News Media." With Aaron Rabirotff. Summer 2002 (\$9,000).

Stillman-Drake Summer Research Grant. "Presidential Honeymoons: A Motivational Approach." Summer 2001 (\$1,200).

Center for Instructional Technology Course Development Grant, Spring 2000. "The Internet, Public Policy, and Political Participation." \$2,000. Awarded for web based course development for a series of public policy and political science undergraduate courses.

Instrumentation Grant, 1998-9 (\$6000).

Arts and Sciences Research Council Grant, 1999-2000 (\$2,000), 1998-9 (\$2,000). 1997-8 (\$2,500). Additional Council grants awarded in 1994, 1995, 1996.

HONORS, AWARDS, AND FELLOWSHIPS

Daniel B. German Visiting Endowed Professorship, Department of Government and Justice Studies, Appalachian State University, 2014 and 2015 academic years.

Competitive Paid Leave Award, Reed College, Spring 2008 (leave for one semester)

Competitive Paid Leave Award, Reed College, Fall 2004 (leave for one semester)

Nominee, Eliza and Joan Gardner Howard Fellowship, 2003-4

Fellow, Joan Shorenstein Center for Press and Politics, Harvard University, Spring 2001 (declined)

Richard K. Lublin Distinguished Award for Teaching Excellence, 1995-6

Nominee, Duke University Alumni Distinguished Teaching Award, 1999

Nominee, Rowman-Littlefield Award for Innovative Teaching, 1996-7, 1997-8

Horace H. Rackham Dissertation Fellowship, 1990

Gerald R. Ford Dissertation Fellowship, 1989-1990

Horace H. Rackham Predoctoral Dissertation Fellowship, 1988-1989

National Science Foundation Graduate Fellowship, 1983-1986
Phi Beta Kappa

BOARD MEMBERSHIP

Advisory Board Member, MIT Election Data and Science Lab. 2016 - present.
National Advisory Board Member, Vote @ Home Institute. 2018 - present.
Advisory Council Member, Oregon Values and Beliefs Center, 2019 - present.

PUBLICATIONS

Books

Gronke, Paul. 2000. *Settings, Campaigns, Institutions, and the Vote: A Unified Approach to House and Senate Elections*. Ann Arbor, MI: University of Michigan Press.

ARTICLES IN REFEREED JOURNALS

- Gronke, P. , Hicks, W. D., McKee, S. C., Stewart, C. and Dunham, J. 2019. "Voter ID Laws: A View from the Public." *Social Science Quarterly*. 100: 215-232.
- Bowler, Shaun, Thomas Brunell, Todd Donovan, and Paul Gronke. 2015. "Election Administration and Perceptions of Fair Elections." *Electoral Studies*. 38(2015): 1-9.
- Gronke, Paul and Peter Miller. 2012. "Voting by Mail and Turnout in Oregon: Revisiting Southwell and Burchett." *American Politics Research*. 40(6): 976-997.
- Gronke, Paul. 2012. "When and How to Teach Election Law in the Undergraduate Classroom." *St. Louis Law Review* 56(3): 735-746.
- Gronke, Paul and Darius Rejali. 2010. "U.S. Public Opinion on Torture, 2001-2009." *PS: Political Science and Politics* 43:437-444.
- Gronke, Paul. 2008. "Early Voting Reforms and American Elections." *William and Mary Law Review*. 17(2): 423-451.
- Gronke, Paul, Eva Galanes-Rosenbaum and Peter Miller. 2008. "Convenience Voting." *Annual Review of Political Science*. Volume 11: 437-455.
- Gronke, Paul and Daniel Krantz Toffey. 2008. "The Psychological and Institutional Determinants of Early Voting." *Journal of Social Issues*. 64(3): 503-524.
- Gronke, Paul, Eva Galanes-Rosenbaum, and Peter Miller. 2007. "Early Voting and Turnout." *PS: Political Science and Politics* 40(4): 639-645.
- Gronke, Paul and Timothy E. Cook. 2007. "Disdaining the Media? Americans' Changing Attitudes Toward the News." *Political Communication*. 24(3): 259-281.
- Cook, Timothy E. and Paul Gronke. 2005. "The Skeptical American: Revisiting the Meanings of Trust in Government and Confidence in Institutions." *Journal of Politics*. 67(3).
- Gronke, Paul and Brian Newman. 2003. "From FDR to Clinton, from Mueller to ?? A Field Essay on Presidential Approval." *Political Research Quarterly*. 56(4): 501-12.
- Gronke, Paul, Jeffrey Koch, and J. Matthew Wilson. 2003. "Follow the Leader? Presidential Approval, Perceived Presidential Support, and Representatives' Electoral Fortunes." *Journal of Politics* 65(3): 785-808.
- Gronke, Paul and John Brehm. 2002. "History, Heterogeneity, and Presidential Approval." *Electoral Studies* 21:425-452
- J. Matthew Wilson and Paul Gronke. 2000. "Concordance and Projection of Representative's Roll Call Votes." *Legislative Studies Quarterly*. XXV: 445-67.
- Gronke, Paul and J. Matthew Wilson. 1999. "Competing Redistricting Plans as Evidence of Political Motives: The

- North Carolina Case." *American Politics Quarterly*, 27: 2 (April) 147-176.
- Alvarez, R. Michael and Paul Gronke. 1996. "Constituents and Legislators: Learning About the Gulf War Resolution." *Legislative Studies Quarterly*, February, 1996: p. 105-128.
- Gronke, Paul. 1992. "Overreporting the Vote in the 1988 Senate Election Study: A Response to Wright." *Legislative Studies Quarterly*, February, 1992: p. 113-129.
- Kinder, D.R., G. Adams, and P. Gronke. 1989. "Economics and Politics in 1984." *American Journal of Political Science*, 33: 491-515.
- Page, B.I., R.Y. Shapiro, P. Gronke, and R. Rosenberg. 1985. "Constituency, Party, and Representation in Congress." *Public Opinion Quarterly*. 48: 741-756.

BOOK CHAPTERS

- Gronke, Paul and Peter Miller. 2019. "Early Voting in America: Public Usage and Public Support". In Ben Griffith (ed), *America Votes! 4th Ed.* Cleveland OH, Lachina Publishing.
- Gronke, Paul and Jacob Canter. 2016. "Convenience Voting and American Election Law." In Ben Griffith (ed), *America Votes! A Guide to Election Law and Voting Rights 2nd Ed.* Cleveland OH, Lachina Publishing.
- Gronke, Paul. 2015. "Voter Confidence as a Metric of Election Performance." In Barry Burden and Charles Stewart III (eds), *Measure of American Elections*. New York: Cambridge University Press.
- Gronke, Paul. 2014. "Early Voting After *Bush v. Gore*." In R. Michael Alvarez and Bernard Grofman (ed), *Election Administration in the United States A Decade After Bush v. Gore*. New York: Cambridge University Press.
- Miller, Peter, Paul Gronke, and Darius Rejali. 2014. "Torture and Public Opinion: The Partisan Dimension." In Tracy Lightcap and James Pfiffner (eds), *Examining Torture: Empirical Studies of State Repression*. New York: Palgrave.
- Gronke, Paul. 2012. "Early Voting: The Quiet Revolution in American Elections." In Matthew Streb (ed), *Law and Election Politics: The Rules of the Game*. Boulder, CO: Lynne Rienner.
- Gronke, Paul, James Hicks, and Timothy E. Cook. 2009. "Trust in Government and in Social Institutions." In Norrander and Wilcox (eds), *Understanding Public Opinion*. Washington DC: CQ Press.
- Gronke, Paul and Brian Newman. 2009. "Public Evaluations of Presidents." In George Edwards III and William Howell (eds), *The Oxford Handbook of the American Presidency*, pp. 232-253. New York: Oxford University Press.
- Gronke, Paul, Eva Galanes-Rosenbaum, and Peter A. Miller. 2008. "From Ballot Box to Mail Box: Early Voting and Turnout." In Cain, Tolbert, and Donovan (eds), *Democracy in the States: Experiments in Elections Reform*. Washington D.C.: Brookings Institute Press.
- Gronke, Paul and Eva Galanes-Rosenbaum. 2008. "The Growth of Early and Non-Precinct Place Balloting: When, Why, and Prospects for the Future." In Ben Griffith (ed), *America Votes! A Guide to Election Law and Voting Rights*. Cleveland, OH: Lachina Publishing.
- Gronke, Paul. 2006. "Public Opinion" and "The Election Campaign." In *World Book Encyclopedia*. Chicago, IL: World Book Publishing.
- Feaver, Peter D., Paul Gronke, and David Filer. 2004. "The Reserves and The Guard: Standing in the Civil-Military Gap Before and After 9/11." In *Reserve Component Contributions to the All Volunteer Army*. Washington, DC: National Defense University.
- Gronke, Paul. 2003. "Politics." In Bigdoli, Hossein (ed), *The Internet Encyclopedia*. New York: John Wiley. (Peer reviewed contribution)
- Gronke, Paul. 2003. "The Election Campaign." In *World Book Encyclopedia*. Chicago, IL: World Book Publishing.
- Gronke, Paul and Peter D. Feaver. 2001. "Uncertain Confidence: Civilian and Military Attitudes about Civil-Military Relations." In Richard Kohn and Peter D. Feaver, *Soldiers and Civilians: The Civil-Military Gap and American National Security*. Cambridge, MA: MIT Press.

POLICY REPORTS (PRIMARY AUTHOR OR CO-AUTHOR)

- “Stewards of Democracy: The Views of American Local Election Officials.” June 2019. With Natalie Adona, Paul Manson and Sarah Cole. Democracy Fund, Washington DC. Report URL:
<https://www.democracyfund.org/publications/stewards-of-democracy>
- “Understanding the Voter Experience: The Public’s View of Election Administration and Reform.” October 2018. With Natalie Adona. Democracy Fund, Washington DC. Report URL:
<https://www.democracyfund.org/publications/understanding-the-voter-experience-the-publics-view-of-elections>
- “Who Votes with Automatic Voter Registration? Impact Analysis of Oregon’s First-In-The-Nation Program.” June, 2017. With Rob Griffin, Tova Wang, and Liz Kennedy. The Center for American Progress, Washington D.C. Report URL:
<https://www.americanprogress.org/issues/democracy/reports/2017/06/07/433677/votes-automatic-voter-registration/>
- “Survey Validation Study.” August 15, 2013. With Lonna Atkeson and Michael McDonald. Report prepared for the Federal Voting Assistance Program, Washington DC.
- “Residual Voting in Florida.” October 2010. Washington, DC: The Pew Charitable Trusts. Available online at http://www.pewcenteronthestates.org/uploadedFiles/Florida_Residual_Vote_report.pdf?n=3568.
- “Data For Democracy: Improving Elections Through Metrics and Measurements.” November, 2008. Washington, DC: The Pew Charitable Trusts. Available online at http://www.pewcenteronthestates.org/report_detail.aspx?id=46600. Organize conference that preceded this report; Oversaw editing and production of report.
- “The 2006 Election Day Survey.” November 2007. With Kimball Brace and Clark Bensen, submitted to the Election Assistance Commission.
- “Uniformed and Overseas Citizens Absentee Voting Act: UOCAVA. Survey report findings.” September 2007. With Kimball Brace and Clark Bensen, submitted to the Election Assistance Commission.
- “The Impact of the National Voter Registration Act: A Report to the 110th Congress.” June 30, 2007. With Kimball Brace and Clark Bensen, submitted to the Election Assistance Commission.
- “Ballot Integrity under Oregon’s Vote by Mail System.” June 15, 2005. Prepared for the Commission on Federal Election Reform, co-chaired by President Jimmy Carter and the Honorable James S. Baker III.

POLICY REPORTS: CONTRIBUTED MATERIALS, RESEARCH, AND WRITING

- “Maryland Voting Systems Study.” December 2010. Prepared by Research Triangle International for the Maryland Department of Legislative Services.
- “Findings and Recommendations for Integrating GIS into the Oregon Central Voter Registration System.” May 2010. With Bryce Gartrell, Ben McLeod, Anthony Iaccarino, and Tim Flez. Submitted to the Division of Elections, State of Oregon.
- “The 2008 Election Day Survey.” 2009. Coauthored as part of a subcontract with the Research Triangle Institute and the EAC.
- “Uniformed and Overseas Citizens Absentee Voting Act: UOCAVA Survey Report Findings.” 2009. Coauthored as part of a subcontract to the Research Triangle Institute and the EAC.
- “The Impact of the National Voting Registration Act: A Report to the 111th Congress.” 2009. Coauthored as part of a subcontract to the Research Triangle Institute and the EAC.

ADDITIONAL WRITINGS AND RESEARCH ACTIVITIES

BLOGS

“Election Security and the 2016 Voter Experience.” December 2, 2016.

<http://www.democracyfund.org/blog/entry/election-security-and-the-2016-voter-experience>

“Americans have become much less confident that we count votes accurately.” August 10, 2016.

<https://www.washingtonpost.com/news/monkey-cage/wp/2016/08/10/are-u-s-voters-confident-in-their-electoral-system-yes-and-no/>

“More states are registering voting automatically. Here’s how that affects voting.” June 16, 2016.

<https://www.washingtonpost.com/news/monkey-cage/wp/2017/06/16/more-states-are-registering-voters-automatically-heres-how-that-affects-voting/>

Ongoing blogging, <http://earlyvoting.net>

OP-EDS, TEXTBOOKS, OTHER WRITING

Textbook essays, “Applying the Principles: Politics in the News.” Sixteen essays analyzing news stories for the 10th edition of Lowi, Ginsberg, and Shepsle *American Government*. New York: W.W. Norton, 2007.

Book Review. Dennis Thompspon, *Just Elections*. *Congress and the Presidency*.

Textbook essays, “Applying the Five Principles of Politics” Sixteen analytical essays for the 9th edition of Lowi, Ginsberg, and Shepsle, *American Government*. New York: W.W. Norton. Summer 2005.

Textbook essays, “Behind the Lines: Understanding the News.” Sixteen essays analyzing news stories for the 9th edition of Lowi, Ginsberg, and Shepsle, *American Government*. New York: W.W. Norton. Summer 2005.

OpEd, “Electing to Change How We Vote; Use of mail-in ballots -- however cheap and convenient they might be -- could erode democratic choice.” *Los Angeles Times*, Editorial, October 16, 2003.

Book Review, Bartels, Larry and Lynn Vavreck (eds). *Campaign Reform*. In *American Political Science Review* 95(December 2001).

Book Review, Krasno, John. *Challengers, Competition, and Reelection*. In *Congress and the Presidency* 1996 (Fall).

WORKING AND CONFERENCE PAPERS (PREVIOUS 10 YEARS)

2020. With Jay Lee. “The Problems of Minimal Support: Considerations for an Establishment Survey of Local Election Officials.” Paper presented at the Annual Meeting of the Southern Political Science Association, San Juan, PR.

2020. With Paul Manson and Natalie Adona. “Staffing the Stewards of Democracy: the Demographic and Professional Profile of America’s Local Election Officials.” Paper presented at the Annual Meeting of the Southern Political Science Association, San Juan, PR.

2019. With Ellen Seljan and Matthew Yancheff. “Happy Birthday! You Get To Vote!” Paper presented at the Annual Meeting of the American Political Science Association, Washington, DC.

2019. With Christopher Mann and Natalie Adona. “Framing Automatic Voter Registration: Partisanship and Public Understanding of Automatic Voter Registration.” Paper presented at the Annual Meeting of the Midwest Political Science Association, Chicago, IL.

2019. With Evan Crawford and Paul Manson. “Surveying Local Election Officials in the United States: Methodological Considerations.” Paper presented at the Annual Conference of the Southern Political Science Association, Austin, TX.

2018. With Robert Griffin, Eric McGhee, and Mindy Romero. “AVR, Voter Registration, and Voter Turnout in Oregon.” Paper presented at the Annual Meeting of the American Political Science Association, Washington, DC.

2018. With Jack Santucci. “Can We Bolster Voter Confidence through Election Administration?” Paper presented at the Annual Meeting of the Midwest Political Science Association, Chicago, IL.

2017. With Robert Griffin, Eric McGhee, and Mindy Romero. “Voter Registration and Turnout under ‘Oregon Motor Voter’: A Second Look.” Paper presented at the Election Sciences, Reform, and Administration Conference,

- Portland OR, July 2017. Revised version presented at the Annual Meeting of the American Political Science Association, San Francisco, CA, September 2017.
2017. With Bryant, Lisa. "A First Look at Voter Confidence and Trust in American Elections in 2016." Paper presented at the Annual Meeting of the Midwest Political Science Association, Chicago IL.
2015. With Phillip Ardoin and Martha Kropf. "Town vs. Gown: College Students and Voting in College Towns." Paper presented at the Annual Meeting of the Midwest Political Science Association, Chicago IL.
2015. With William D. Hicks, Seth C. McKee, Charles Stewart, and James Dunham. "Voter ID Laws: A View from the Public." Paper presented at the Annual Meeting of the Midwest Political Science Association, Chicago IL.
2013. "Are we confident in voter confidence? Observations on perceptual measures of electoral integrity." Paper presented at Workshop of the Electoral Integrity Project, Cambridge, MA, June 3, 2013.
2013. With Charles Stewart III. "Early Voting in Florida." Paper presented at the Annual Meeting of the Midwest Political Science Association, Chicago, IL.
2012. With Jacob Canter. "Voter Confidence and the Quality of the Vote Count." Paper presented at the Measuring Democracy Conference, Massachusetts Institute of Technology, Boston MA, June 2012.
2011. With Kambiz GhaneaBassiri. September, 2011. "Explaining American Anti Muslim Opinion." Paper presented at the "Muslims in the US and Europe: Islamophobia, Integration, Attitudes, and Rights." Indiana University, Bloomington, IN.
2011. With Darius Rejali and James Hicks. "Explaining American Support for the use of Torture." Paper presented at the Annual Conference of the International Society for Political Psychology. Istanbul, Turkey.
2011. With James Hicks. "Bush v. Gore: A Critical Juncture in Early Voting?" Paper presented at "Bush v. Gore: Ten Years After." Center for the Study of Democracy, University of California, Irvine, April 16-17, 2011.
2009. With James Hicks. "Early Voting: The Rhetoric and The Reality of Election Reform." Paper presented at the Annual meeting of the Midwest Political Science Association.
2009. With Peter Miller. "Voting by Mail in Washington and Turnout." Working paper.

SYMPOSIA, COLLOQUIA, NOTABLE SPEAKING ENGAGEMENTS

MEDIA AND OTHER PUBLIC APPEARANCES

- Election night analyst, KATU-TV, May 17-18, 2016.
- Invited panelist, Portland City Club Event "The Supreme Court Speaks on Marriage Equality". June 28, 2013
- Moderator, Portland City Club Debate for Metro Council President. October 2010.
- Invited to speak in opposition, City Club Debate on Measure 65 (Top Two Primary), October 2008.
- Thousands of appearances in press outlets as an expert on early voting, election reform, and elections.
- Television appearances include regular appearances on "Your Voice: Your Vote" (KATU-TV, Portland OR); 2012 and 2010 election night commentary (KGW-TV, Portland OR), and numerous on camera interviews on local and national outlets, including KGW, KATU, NBC Today Show, the O'Reilly "Factor", and other local and regional newscasts.
- Radio commentary on Oregon Public Radio's "Think Out Loud," interviews on NPR national and regional news programs (All Things Considered, Weekend Edition, etc.), and many other regional and national outlets

ELECTION REFORM AND ADMINISTRATION ACTIVITIES

- Invited Speaker, Auburn Symposium on Election Administration, Auburn, AL. Oct. 14-16, 2019.
- Invited Speaker, California Association of Clerks, Records, and Elections Officials, San Francisco, CA, July 25, 2019.
- Invited Speaker, Western States Elections Conference, Stevenson, WA, July 7th, 2019.

Invited Panel Participant, Election Assistance Commission's Election Data Summit, Washington D.C., June 27, 2019.

Invited Speaker and Breakout Group Leader, Expanding Voting Options Conference, Washington D.C., June 20th, 2019.

Invited Speaker, "How Data and Academic Research Can Improve Election Administration." Oregon County Clerk Winter Meeting, February 2018.

Invited Speaker, "Increasing Voter Turnout –the Academic Perspective." NASED, August 24, 2017.

Invited speaker, Election Policy Summit, Pennsylvania Department of State. "Early Voting/No Excuse Absentee Voting." April 19, 2017.

Invited speaker and participant, U.S. Election Assistance Commission Election Data Summit, August 12-13, 2015.

Panelist and Moderator, "Oregon's Automatic Voter Registration and Other Registration Initiatives," National Conference of State Legislature Legislative Summit, Seattle, WA, August 3, 2015.

Expert Witness, Presidential Commission on Election Administration, Denver, CO, August 8, 2013 .

Invited speaker, Pew Center on the States' Election Initiatives "Voting in America 2012 Post-Election Summit," Washington DC, Dec. 10-11, 2012.

Invited speaker, National Association of County Officials annual meeting, Portland, OR July 2011.

Invited speaker, National Association of Clerks, Recorders, and County Officials annual meeting, Portland, OR July 2011.

Witness, DC City Council Subcommittee on Government Operations and the Environment, Hearing on the election readiness for the April 26, 2011 special election, January 19, 2011.

Invited speaker, Pew Center on the States Journalists' briefing for the 2010 election, San Francisco, CA. October 2010.

Invited participant, DEMOS Planning Conference, Washington DC. September 4, 2010.

Invited participant and steering committee member, "Performance Index of Elections," an initiative of the Pew Center on the States, Providence, RI, July 2010-ongoing.

Invited participant, DEMOS Conference on Election Day Registration, Chicago, IL. April 2010.

Organizer and Host, "Time Shifting the Vote: The Early Voting Revolution in America." Conference organized by the Early Voting Information Center at Reed College under the auspices of the Pew Center on the States. The conference brought thirty-five academic experts, election officials, and policy makers together to present research and craft policy recommendations. October 9-10, 2009.

Invited Speaker, Maryland Association of Election Officials. Rocky Gap, MD. June 7-9 2009.

Discussion Leader, AEI/Brookings Election Reform Project Conference on Election Reform. June 2, 2009.

Committee member, 2008/2009 Study Group on the Future of Elections in Kansas. Office of the Kansas Secretary of State.

Invited speaker, 2009 winter meeting of the National Association of Secretaries of State, Washington DC.

Plenary speaker, panel leader, and panel organizer, "Voting in America: The Road Ahead." Conference organized by the Pew Charitable Trusts' Make Voting Work project. Washington, DC. December 8-10, 2008.

Invited Speaker, "Making Elections Work: The Law and the Process After November." December 4, 2008 conference co-sponsored by the AEI/Brookings Election Reform project, the *Election Law Journal*, and the University of California Washington Center.

Invited Speaker, Journalists Briefing in Preparation for the 2008 General Election. Democratic and Republican National Conventions. August and September 2008.

Organizer, "Data for Democracy Conference." Conference sponsored by the Pew Center on the States. Washington, DC. May 2008.

Invited Speaker, Journalists' Briefing in Preparation for the 2008 Primaries. Pew Charitable Trusts and electionline.org, San Francisco, CA. December 2007.

Invited participant and presenter. "The Growth of Early Voting: When, Why, and Prospects for the Future."
Legislatures and Election Reform Institute, Aspen, CO. November 14-16, 2007.

Invited speaker, 2007 Summer Meeting of the National Association of Secretaries of State, Portland, OR.

Invited participant, Biannual Meeting of the Northwest Association of County Election Officials, Portland, OR.
May 2006.

ELECTION MONITORING

With the OSCE Office for Democratic Institutions and Human Rights:

Russia Presidential Election, Spring 2018

Ukraine Presidential Election, Summer 2014

Albania Parliamentary Elections, June 2013

Kyrgyzstan Presidential Elections, October 2011

OTHER ACADEMIC CONFERENCES AND INVITED LECTURES

Co-Organizer and Convener, Inaugural Election Sciences, Reform, and Administration Conference. July 27-29, 2017.
Portland State University and Reed College. <https://blogs.reed.edu/election-science/>

Organizer, Election Sciences Working Group for the American Political Science Association Annual Meeting,
Philadelphia, PA, 2016.

Invited presenter, "Measures of American Elections Conference," Massachusetts of Technology, June 18-19, 2012.

Invited participant and presenter. "Political Science in the Liberal Arts." AALAC Workshop, Amherst College,
Amherst MA, November 11-12, 2011.

Invited participant and presenter. "Muslims as Enemy? Explaining American Anti-Muslim Attitudes." Paper
presented at the Islam in the Public Sphere Conference, WISER Center at the University of Washington, Seattle,
WA. June 2011.

Invited participant and presenter. "Bush v. Gore: Ten Years After." Center for the Study of Democracy, University of
California, Irvine. April 16-17, 2011.

Invited participant and presenter. "Democracy Index Conference." Moritz School of Law, Columbus, OH. September
28-29, 2007.

Invited participant and presenter. "Academic Conference on Elections Research." AEI/Brookings Election Reform
Project, Washington DC. May 18, 2007.

Invited participant and presenter. "Early Voting and Technology." Caltech/MIT Voting Technology Project Vendor's
Conference, Pasadena CA. March 13, 2007.

Invited participant. "Conference on Election Reform." Conference sponsored by the AEI/Brookings Election
Reform Project, Washington DC. May 23, 2006.

Paper presenter and participant. "Early Voting and Progressive Mobilization." Presented at the Progressive Targeting
Conference, sponsored by the Center for American Progress, Washington DC.

Invited participant. "Vote by Mail: The Academic Perspective." Pew Conference on Vote by Mail and Campaign
Conduct, Portland OR, November 2003.

Invited Lecture. "Disdaining the Media: Changing American Attitudes Toward the News." University of Washington,
April 2001.

COLLEGE AND DEPARTMENTAL LEADERSHIP POSITIONS

Co-Chair, Ad Hoc Committee on Governance, 2017-18.

Chair, Reed College Institutional Review Board, 2016-17.

Member. Dean's Search Committee. 2009-10.

Chair. Department of Political Science, Reed College. September 2001-August 2004; January 2005-August 2007; July 2009-2010

Member (campus-wide elective position). Committee on Academic Planning and Policy. 2006-2007.

Chair. tenure track Environmental Politics Search 2009-10; visiting American Politics Search 2006-7; tenure track IR/Comparative Search, 2005-6; visiting searches (various fields) 2009-10, 2005-6, 2003-4.

Director. Reed Public Policy Workshop. 2001-2002; 2005-present

Organizer and coordinator. Ducey and Munk-Darling International Affairs lecture series. 2002-2007 (http://web.reed.edu/public_policy_series), 2009-present

Official Representative. Inter University Consortium for Political and Social Research. 2001-present.

Elected member. Duke University Arts and Sciences Council. 1998-9.

OTHER INSTITUTIONAL AND DEPARTMENTAL ACTIVITIES

Campus wide lectures:

Post Election Roundtable for Parent/Family Weekend, November 2010 and November 2008.

Alumni Affairs and College Development:

Reed Reunions 2017:

Class of '67 Salon: "What Happened? And What Happens Next?"

Public Lecture: "Perspectives on the 2016 Election and Beyond"

Presentation and Discussion, "Collaborative Learning in the Age of Big Data"

Forum for Advancing Reed Lunch Speaker, September 17, 2016.

Reed Alumni Travel-Study Group Leader: LBJ and the Hill Country, April 2013 and April 2014

Major gifts outreach visit, Redmond WA, June 2011

Foster-Scholz Lecturer for the Foster-Scholz Club (Reed alumni living in Portland), 2004

"Reed on the Road" Alumni speakers series, Fall 2004 in Chicago and Washington DC

Reed alumni board national meeting, invited speaker, Fall 2004

Lecturer on American Politics and Campaigns, Duke University Alumni Program (1995-1999).

Trustee events:

Participant on a roundtable discussion with Board of Trustees, "Impacts of the new administration on the academy", February 2017

Moderator for a 2012 Spring Trustee Dinner Roundtable: Running for Office, with Mark Weiner '04 and Suzan Delbene '83

Amanda Reed Lecture, Annual Trustee and CAT/CAPP Dinner. "Finding Snow White Among the Many Dwarves: The Modern Presidential Nomination System." October 5, 2007.

Student Affairs / Student Life:

Organizer and Emcee, "How to Change the World (and Get Paid Doing It), Reed Student and Alumni Career Development

Faculty Associate, Kilgo Quad (1998-1999), Trent Hall Dormitory (1999-2000)

Faculty in Residence, Pegram Dormitory (1995-98)

Committee membership (Reed College)

Institutional Research Board Co-Chair (2016-17); Facilities (2013-14); Staff/Faculty Benefits (2011-13);

Emergency Planning (2010-11); Ad Hoc Committee to Establish an Environmental Studies Program at Reed

College (2004-2006); Computing Policy Committee (2001-2004); Art Management (2001-2004); Ad Hoc

One-Card (2001-02).

Committee membership (Duke University)

University-wide Teaching Award (1998-2000); Department Undergraduate Affairs (1992-94, 1999-2000).

DISCIPLINARY AND SCHOLARLY LEADERSHIP POSITIONS

Professional Associations

American Political Science Association.

Chair, Committee for the John Sullivan Award for Best Paper, 2016 Annual Meeting, Elections, Public Opinion, and Voting Behavior Organized Section
Parliamentarian, 2016 All-Members Meeting
Member, Executive Council of the American Political Science Association, 2011-13
Member, Audit Committee, 2011-2013
Member, Ad Hoc Committee on the Public Understanding of Political Science, 2010-11
Member, Trust and Development Committee, 2005-2006

Western Political Science Association.

Council Member, 2005-2008.

Organized Section on Elections, Public Opinion, and Voting Behavior (APSA)

Communications Director and Council Member, 2003-2006

Conferences

International Joint Conference on Electronic Voting (E-VOTE-ID).

Program Committee, 2016 and 2015.

Section head

Teaching and Learning, 2014 Southern Political Science Association Annual Meeting
Communications and the Media, 2007 Southern Political Science Association Annual Meeting
Elections, 2004 Western Political Science Association Annual Meeting.

Tenure and promotion reviews

Tufts University; Stetson University; University of North Carolina, Charlotte; John Jay College; Bucknell College;
University of Vermont; University of Utah; Randolph Macon College; Colorado College; Grinnell College

REFERENCES

Available upon request.

Last Updated November 11, 2019

**IN THE UNITED STATES DISTRICT COURT
FOR THE MIDDLE DISTRICT OF NORTH CAROLINA**

DEMOCRACY NORTH CAROLINA, THE
LEAGUE OF WOMEN VOTERS OF
NORTH CAROLINA, DONNA PERMAR,
JOHN P. CLARK, MARGARET B. CATES,
LELIA BENTLEY, REGINA WHITNEY
EDWARDS, ROBERT K. PRIDDY II,
WALTER HUTCHINS, AND SUSAN
SCHAFFER.

Plaintiffs,

vs.

THE NORTH CAROLINA STATE BOARD
OF ELECTIONS; DAMON CIRCOSTA, in
his official capacity as CHAIR OF THE
STATE BOARD OF ELECTIONS; STELLA
ANDERSON, in her official capacity as
SECRETARY OF THE STATE BOARD OF
ELECTIONS; KEN RAYMOND, in his
official capacity as MEMBER OF THE
STATE BOARD OF ELECTIONS; JEFF
CARMON III, in his official capacity as
MEMBER OF THE STATE BOARD OF
ELECTIONS; DAVID C. BLACK, in his
official capacity as MEMBER OF THE
STATE BOARD OF ELECTIONS; THE
NORTH CAROLINA DEPARTMENT OF
TRANSPORTATION; J. ERIC BOYETTE,
in his official capacity as
TRANSPORTATION SECRETARY; THE
NORTH CAROLINA DEPARTMENT OF
HEALTH AND HUMAN SERVICES;
MANDY COHEN, in her official capacity as
SECRETARY OF HEALTH AND HUMAN
SERVICES,

Defendants.

Civil Action No. 20-cv-457

**DECLARATION OF GARY BARTLETT IN SUPPORT OF PLAINTIFFS’
MOTION FOR PRELIMINARY INJUNCTION**

I, Gary Bartlett, hereby declare as follows:

1. I am a U.S. citizen and a resident of Wayne County, North Carolina. I am currently an independent consultant based out of Goldsboro, North Carolina and President and CEO of the Elections Administration Resource Center 501(c)(3) d/b/a Ranked Choice Voting Resource Center. I am a 1976 graduate of University of North Carolina at Chapel Hill, having earned a B.A. in history.

Relevant Background

2. From 1993 to May 15, 2013, I served as the Executive Director of the North Carolina State Board of Elections.
3. My responsibilities as Executive Director of the State Board of Elections were designated in Chapter 163 of the North Carolina General Statutes. In this role, I was responsible for staffing, administering, and executing the State Board of Election's decisions and orders, as well as other responsibilities assigned to me by the State Board, and was the chief State elections official in North Carolina. My responsibilities also included overseeing North Carolina's 100 county election boards to ensure that they correctly managed all primary and general elections on a state, county, and local levels. All officials involved in election procedure inside North Carolina either directly or indirectly reported to me.
4. During my tenure as Executive Director, I oversaw dramatic changes in North Carolina's voting practices. These included (i) bringing North Carolina into compliance with the National Voter Registration Act of 1993, including implementing agency voter registration and management systems; (ii) the

initiation in 2000 of early voting options; (iii) the expansion in 2001 of absentee ballots to all voters without requiring a qualifying excuse; (iv) offering a system that allowed voters to check their registration status online prior to an election; and (v) allowing for same-day registration during early voting starting in 2007. I was also personally involved with ensuring disabled voters had the means to cast their ballots, both with absentee voting procedures and ensuring that polling places would be handicap-accessible if at all possible. Also, with the assistance of staff, I developed and implemented an election certification program to train and educate election officials. Innovations I implemented during my tenure include a procedure and policy manual that covered every part of election duties and responsibilities, an on-line elections library, and a self-audit program for counties to ensure compliance and that they were staying up-to-date.

5. North Carolina's voter turnout increased dramatically under my leadership. Shortly after the beginning of my tenure, in 1996, North Carolina ranked almost last (fortieth) of all states.¹ By the end, in 2012, North Carolina ranked twelfth nationally in voter turnout.²

¹ See Voter Registration and Turnout – 1996, United States Election Assistance Commission, https://www.eac.gov/sites/default/files/eac_assets/1/6/1996%20Voter%20Registration%20and%20Turnout%20by%20State.pdf.

² See The 2012 Election Administration and Voting Survey at p. 9, United States Election Assistance Commission, https://www.eac.gov/sites/default/files/eac_assets/1/28/990-050_EAC_VoterSurvey_508Compliant_1.pdf

6. During my tenure as Executive Director of the State Board of Elections, I was an active member in the National Association of State Election Directors (better known as NASED). I am a former board member of the Election Center, which is an association of election officials from across the United States and some areas of Canada that get together to help resolve election issues, provide educational opportunities and explore new or better ways of how to administer elections. I have also been involved with the National Task Force on Election Reform, and was the national co-chair for four years of the National Task Force on Elections Accessibility. I also served on the Federal Elections Commission Advisory Panel and the Standards Board of the United States Election Assistance Commission.
7. Before serving as Executive Director, I served as a legislative assistant to N.C. Congressman H. Martin Lancaster. I have appended my full CV as Exhibit 1 to this Declaration.
8. I have served as an expert witness in *Gilbert v. Guilford County*, Case No. 13 CVS 3227 (Guilford Cty. Super. Ct), *Third Sector Development, Inc. v. Kemp*, Civil Action No. 2014CV252546 (GA Super. Ct), and *Ga. State Conf. of the NAACP v. Georgia*, No. 1:17-cv-1427 (N.D. Ga.). I will be paid a fee of \$2,500 for preparing this report, with additional compensation should my testimony be required in this case.
9. During my tenure as Executive Director, I also oversaw the administration of elections notwithstanding challenges presented by natural disasters in North

Carolina, including Hurricane Floyd in 1999, Tropical Storm Gustav in 2002, a tornado knocking out power at a polling place in Brunswick County, a freak ice storming causing a special election in Harnett County Township to stop and be rescheduled. In addition to rescheduling elections due to flooding caused by Hurricane Floyd in Lenoir and Edgecombe Counties, my office facilitated voter participation by many displaced voters in Edgecombe County, whose homes were destroyed. The State Board of Elections joined in a Consent Decree with the U.S. Department Justice to allow those voters to vote in polling place corresponding to their residence before the flood in the next general election so they would not be disenfranchised by residency laws.

10. Other non-natural disasters occurred during my tenure that impacted elections.

Examples of these incidences include bomb threats, a voter tragically killed by a car in front of polling after voting, a chemical truck wreck causing the poll to close and voters be redirected, and state authorities closing the only road to a polling place to repave on election day.

11. In my view, these natural and non-natural disasters pale in comparison to the challenges to elections presented by the Covid-19 virus pandemic.

12. I have read Executive Director Karen Brinson Bell's letters dated March 26, 2020, and April 22, 2020, to Governor Roy Cooper and the General Assembly Leadership recommending how to "address election-related issues affected by

COVID-19.”³ I generally concur with her requests and find them well thought out and practicable. I believe that the State Board of Elections and the county boards of elections will perform their duties to the best of their abilities with the aim of achieving a fair and successful general election in November, but that they will only be able to achieve this result if they are able to implement changes to the current North Carolina election code and the election administration that are needed in the interest of safety, efficiencies, fairness. Many changes are needed.

North Carolina’s Voter Registration During COVID-19

13. As we experience the unknowns, trials, and tribulations of the novel coronavirus pandemic, it is important that we reevaluate how citizens can register and safely, easily, and securely cast their votes in the upcoming elections. Our worst of times can bring out our best: Working together, building trust, exploring innovations and establishing federal, state and local partnerships to ensure that all eligible voters can exercise their right to vote.

14. Federal and state laws provide many opportunities in registering to vote. During my tenure, the most popular and traditional ways were North Carolina Driver License Offices (DMV), Public Service Agencies, Employment Security Commission, at the County Board of Elections office, and the do-it-yourself mail-in form. Before a general election, especially a presidential election year,

³ I understand these letters have been filed as Exhibits 1 and 2 to the Complaint in this matter.

voter registration drives are rich in tradition, effective, and generate enthusiasm leading into the election. They are carried out by, but not limited to, civic activists and organizations, political parties, partisans, candidate committees, and churches.

15. Certainly, COVID-19 has had a chilling effect on registering new voters and encouraging them to vote in the upcoming general election. I understand that while there was an increase of 162% in voter registrations in January 2020 compared to January 2016, by April there was a 50 percent decrease in voter registrations compared to April 2016. In my experience, this decline is very unusual for a presidential election year and reflects a lack of accessible options for eligible individuals to register to vote.

16. In my experience, given the challenges that the coronavirus pandemic is presenting to voter registration, the 25 day deadline before an election for voter registration should be extended through to the close of One-Stop Absentee Voting (Early Voting) to allow eligible individuals the opportunity to register to vote. Furthermore, the canvass period needs to be extended a month to ensure enough time for verification mailings, processing, inspection of the public, and challenges if necessary.

17. It is also crucial that North Carolina voters be given greater access to online voter registration during this time, when the classic in-person voter registration activities are no longer feasible due to the coronavirus pandemic. In my view, there is no justification for North Carolina's failure to expand online voter

registration to date. As early as 2007, the IT division at the State Board of Elections had an on-line voter registration system ready to test and roll out. However, this platform was never approved by the legislature. During the same time frame or shortly thereafter, we tried to get agency-based voter registration placed in the N.C. Department of Health and Human Services' Families Accessing Services through Technology ("FAST") program so voter registrations could be automated, but this was unsuccessful and voter registration and stayed paper-based. Ironically, the Employment Security Commission was totally automated, allowing individuals to enroll in certain services online, but voter registration remained paper-based.

18. It is my view that, given the current barriers to voter registration (and the resulting barrier to voting this will present), all agencies dealing with voter registration should offer on-line voter registration and digitized signatures should be allowed. More crucially, the State Board of Elections should offer this important, necessary service directly.

COVID-19 Challenges to In-Person Voting

19. Changes are also needed to ensure that voters in North Carolina can safely vote in person. North Carolina has a culture of voting in-person, both during one-stop "early" voting and on Election Day. During my tenure as Executive Director, I tried to persuade the General Assembly and the Municipality of Bald Head Island to hold a pilot program for an all mail election. There were 101 registered voters on the island, and they all had to travel by ferry to their polling place in

order to vote in person. Both the Village Council and the General Assembly strongly rejected the elimination of in-person voting, and I saw through this experience that traditions, such as in-person voting, are hard to change regardless of merit.

20. Even before COVID-19, early voting has been vital to facilitating in-person voting, and has allowed county boards of elections to reduce crowding and long lines. Until early voting was implemented in 2000, long lines were the norm in presidential elections, and wait time at the close of the polls with voters in line could run from one to four hours in our urban counties. However, North Carolina voters now love early voting, and it continues to be the most popular way to cast a ballot.

21. As Executive Director Bell mentions in her March 26, 2020 letter, there are two provisions of North Carolina's election code that need to change in order to ensure North Carolina voters can vote safely in-person. First, the uniform hours requirement, requiring early voting sites to all have uniform hours within each county, will hurt more than it helps during the ongoing pandemic because this requirement generally causes closure of early voting sites. In short, uniform hours are not the best and most efficient way to process early voters because every county has varying hours of the day and night that voters choose to come to vote. For example, early voters in rural areas tend to vote in earlier hours, whereas counties with shift work and factories tend to vote later. Furthermore, night and weekend voting is essential, and is likely to only be possible if counties

have the flexibility to choose varying hours for their precincts. In sum, the more early voting opportunities are available, the better and safer the general election will be.

22. The second important change that is required is to eliminate the requirement that a majority of poll workers come from the precinct they serve in. There are many reasons for this. For example, curbside voting will be very important this election, and it requires poll workers to facilitate this method of voting. The majority precinct poll worker requirement will strain the responsibilities poll workers have for processing voters in the polling place, including curbside voting. In some locations, workers might be needed for traffic control management as well. Labor is the most expensive and important part of the election process. The requirement that a majority of poll workers be from the precinct in which they are serving will put a strain on the crucial resource of labor, and will do so when curbside voting is likely to be more important and sought after than ever.

23. These changes are not merely needed to reduce inconveniences, they are critical to reducing crowding and long lines, and therefore to ensuring safe elections during the ongoing pandemic. It is important to remember that voters will not be the only individuals at voting sites: during early voting and Election Day, there will likely also be electioneers / campaigners and others who congregate at the 50 foot line from the polling place. If there are also long lines for voters, this

could cause large crowds outside of polling sites even if social distancing is made possible within.

The Need to Expand Access to Ballots By Mail In Light of COVID-19

24. In my experience, the ongoing pandemic requires that changes be made to absentee voting by mail in light of the need for many voters to social distance. As an initial matter, absentee applications and ballot requests by the voter or near relative should be accepted via phone, fax, email, text, and on-line as long as it can be traceable back to the voter. In my view, this change is a long time coming, and Executive Director Bell's request for funding and developing of a public access portal for absentee management and transparency is necessary regardless of COVID-19. It is imperative, however, now. It is also important that these changes are implemented immediately because of the almost certain increased volume of voters wishing to vote by mail as well as other considerations, such as providing for secure storage and processing of absentee mail-in ballots, which are likely to impact every county.

25. Secure drop boxes for absentee ballot envelopes should be strategically placed for voter use. Oregon and other states have successfully implemented this service, and North Carolina could easily replicate the systems that work in these states. In short, in my view there is no reason for North Carolina to fail to provide secure drop boxes, especially given that they would not have to reinvent the wheel to do so.

26. There is also a need to allow voters to remedy any issues with their absentee ballot request forms or absentee ballots. I am not aware of any uniform procedure in effect right for county boards of election to do so. During my time, and as a requirement for HAVA funding, the State Board had to define and publish, “Standards for Determining What Constitutes A Vote.” By unanimous vote of a bipartisan State Board of Elections, this was ordered and executed before the 2006 election. Under the guidance in this document, if there were essential missing pieces of information on the absentee ballot form (container envelope), the county board of elections had to make a good faith effort to contact the voter and resolve the issue(s). I am concerned that after my tenure as Executive Director, new county directors and board members have not been made aware of this guidance and, as a result, I am not aware of any uniform procedures for voters to cure their absentee ballots or request forms.

27. Without a robust and successful voter participation in mail absentee and early voting, it is likely that voters will either be prevented from voting entirely, or they will try to vote on Election day and that counties, especially those that exceed 5,000 voters in a precinct, will experience long lines as a result. Furthermore, long lines and crowding are not just unsafe during the ongoing pandemic, but in my experience I have found that long lines will cause some voters to come seeking to vote only to leave without casting a ballot. Although splitting these precincts is theoretically an option, such a move would require even more poll workers and would incur an increased level of expense. It would

also cause possible confusion. In other words, this would be a last resort for preventing long lines. It would be much better to make absentee voting by mail easier and to allow for expanded opportunities for one-stop “early” voting.

28. In my view, the two-witness signature requirement, which I understand was enacted to prevent absentee ballot fraud, needs to be temporarily suspended or dropped in light of the importance of voting by mail to the upcoming general election. The challenges presented by the ongoing pandemic have rendered this requirement too high a burden on voters, and its enforcement will disenfranchise eligible voters who, for health and safety reasons, cannot obtain two witnesses to their absentee ballot. I am familiar with past illegal activities involving incidences of voter fraud, and in my experience I believe the voter’s signature or mark should be accepted and will be adequate for the upcoming general election to ensure a safe and secure election. Other measures, such as fining or incarcerating violators, would be much more effective in deterring voter fraud than imposing a blanket two-witness requirement, and these alternative measures moreover do not present the same barrier to voting that the two-witness requirement will.

The Need To Prepare Now for The November 3, 2020 Election

29. I agree with Executive Director Bell’s assessment in her April 22, 2020 letter that immediate action is needed to meet deadlines associated with the upcoming general election. She is correct that any expansion of absentee ballot requests need to be made immediately because voters may also be trying to request

absentee ballots for the November 3 election, and any change to the witness requirement needs to be reflected on the absentee ballot instructions and envelope. She is also correct that changes to the poll worker precinct requirement and uniform hours requirements need to happen soon so that county boards of elections can start recruiting poll workers and making decisions about voting sites.

I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct to the best of my knowledge.

Executed this 3 day of June, 2020.

Gary Bartlett
Gary Bartlett

EXHIBIT 1

Gary O. Bartlett

209 Cashwell Drive, Goldsboro, NC 27534

H: (919) 735-3006 * C: (919) 705-3366

gobartlett@nc.rr.com

HIGHLIGHTS OF EXPERIENCE

- Managed state agency representing 100 counties, 500+ municipalities.
- Supervised 152 staff and provided oversight to 750 county board members and staff and 25,000 election officials.
- Managed a budget for planning and implementation that ranged from \$5.7 to \$6.4 million.
- Managed federal grants equaling \$84 million.
- Extensively worked under Board leadership; effective implementing orders and assignments.
- Provided oversight to education and training of election officials and certification programs.
- Resolved time sensitive issues in a public forum.
- Provided oversight to Investigations and Investigative Hearings.
- Implemented laws, rules, policies and guidelines.
- Served as agency legislative liaison.

WORK EXPERIENCE

Current	General Consultant Hospice Volunteer for 3HC at Kitty Askins Hospice and Crystal Coast Hospice
6/2013	Panelist for the Lawyers Committee For Civil Rights on “Crafting the Ideal Elections Administration System”, 50 th Anniversary Legal Symposium, Georgetown University Law Center
8/3/1993 – 5/15/13	North Carolina State Board of Elections Executive Director Responsible for staffing, administration, execution of decisions and orders and other responsibilities as assigned by the Board. Managed Agency’s divisions - Administration, Campaign Finance and IT and Agency Legislative Liaison. See detailed summary. Member of National Association of State Election Directors N.C. Representative - Standards Board of the Elections Assistance Commission Panelist on NVRA Section 7 Compliance, U.S. Commission on Civil Rights Member of the FEC Election Administration Advisory Panel Election Center Board of Directors (professional and elections national non-profit) Co-Chair National Task Force on Election Accessibility Member of Four Governors Better Campaigns Committee
Prior employment:	Legislative Assistant, Congressman H. Martin Lancaster Management, Weil Enterprises Consultant, Business Matters, Inc.

**North Carolina State Board of Elections, Executive Director
Detailed Summary of Duties and Responsibilities**

As Executive Director of the State Board of Elections, I have duties that involve large-scale oversight, others that are directly managerial and supervisory, and still others that are judicial or discretionary in nature.

Large-scale oversight

- Chief elections officer of the state; oversight for the State Board of the conduct of all primaries and elections throughout North Carolina.
- Ultimate supervisory responsibility for 100 directors of county boards of elections.
- Oversight of 300 county board members, 350 county board staff employees, and 8,400 precinct judges.
- Responsibility for implementation of elections laws, including the National Voter Registration Act, the Help America Vote Act, Chapter 163 of the North Carolina General Statutes, and the regulations of the State Board
- Implementation of North Carolina's first statewide computerized elections information system the (State Elections Information Management System) and four major revisions and oversight of its operation.
- Management of registration of almost 7,000,000 voters.
- Oversight of 800 non-elections agencies where voter registration is conducted
- Implement state and federal laws by interpreting and formulating policies, procedures, rules, guidelines and management.

Managerial and supervisory

- Day-to-day direct supervision of the office of the State Board of Elections, with 52 employees;
- Management of the drafting and editing of job descriptions and postings, performance or oversight of employee reviews, and conduct of grievance, disciplinary and dismissal proceedings and mediations.
- Development and administration of the budget of the agency.
- Frequent newspaper, television and radio interviews.

Judicial or discretionary

- Execution of emergency powers as defined by statute if election schedule is disrupted.
- Oversight of State Board hearings.
- Presentations to General Assembly committees.
- Issuance of campaign finance written opinions and mediation of penalties.
- Oversight of investigations and investigative hearings.

WORK EXPERIENCE PRIOR TO STATE ELECTIONS EXECUTIVE DIRECTOR

- January 1991 – July 1993, Congressman H. Martin Lancaster
 - Campaign Manager, Lancaster for Congress 1986, 1990, 1992;
- September 1983 – December 1990, Managing Agent, Weil Enterprises;
- May 1976 – August 1983, Oz Bartlett, Inc.
 - Part-time June 1969 – September 1970; June 1971 – May 1976;
- September 1970 – May 1971, Gideon's Jewelry Store.

HIGHLIGHTS OF EXPERIENCE AND QUALIFICATIONS

- Legislative Assistant, Congressman Lancaster: Monitored U.S. House Committees and constituent services related to: Small Business (Congressman was a member), Commerce, Utilities, Trade, House Administration and Post Office. In addition, assisted governments within the District, monitored redistricting and attended to political matters;
- Managing Agent, Weil Enterprises: oversight and management of rental properties and Section 8 Housing, Carolina Terminals (30% nitrogen storage and loading facility) and civic projects for the Chamber, Goldsboro and Wayne County;
 - Civic Projects: Guidance to ad hoc Goldsboro City School Citizen Group; The four bond referenda for Wayne Community College, Wayne County Schools, Courthouse and Economic Development in late 1980's; City of Goldsboro Mixed Beverage Referendum;
- Mason and Laborer, Oz Bartlett, Inc.: Began as part-time through high school and college; full-time upon graduation;
- Engraver, Gideon's Jewelry Store – Part-time.

Efficiency and Innovation

During My Time at the North Carolina State Board of Elections

I was determined to improve the efficiency of elections administration in our state and to be innovative. With the help of a great number of terrific people, I was successful.

Efficiency

- We instituted one of the most thorough ballot proofing processes in the nation.
- We put in place one of the most comprehensive and cost-effective voter registration systems in the nation.
- We were a leader among states in developing uniform standards (forms, letters, notices, etc.) for election jurisdictions.
- Our office was the first state elections agency in the nation to implement technology (through bar code scanners) to ensure that voters receive the proper ballots.
- North Carolina was the first southern state (and one of first states nationally) to implement the requirements of the National Voter Registration Act of 1992.
- North Carolina is recognized nationally as a model for states to follow in managing voter registration at non-elections offices such as the DMV or social services offices.

Innovation

- We implemented one of the nation's first certification programs for elections officials.
- We put in place a unique system of regional technicians to ensure proper maintenance and use of elections equipment, even in counties with modest resources.
- We are recognized as having an outstanding elections night return system.
- We conducted the first statewide election in the era of modern voting machines using the instant runoff voting method, an achievement requiring significant creativity.
- Our voter accessibility program is a national model.
- We were among the very first states to offer voters the ability to check their registration, voting record, and provisional voting status on-line.
- Ours was the first and is still the only state election office to conduct wellness checks of its county election offices to ensure compliance and uniformity.

PUBLICATIONS

Gary O. Bartlett and Robert P. Joyce, "Would North Carolina Have Looked as Bad as Florida on Election Night 2000?" Popular Government, Institute of Government, University of North Carolina at Chapel Hill, Chapel Hill, N.C. (Fall 2002).

Gary Bartlett, *Health & Human Services Accessibility - HAVA Grants in North Carolina*, January 2010, available at <https://www.ncsbe.gov/Portals/0/FilesP/HAVAAccessibilityNASED.pdf>.

Testimony before U.S. Commission on Civil Rights, *Increasing Compliance with Section 7 of the National Voter Registration Act* (Apr. 19, 2013) (testimony of Gary Bartlett), available at <https://www.usccr.gov/pubs/docs/NVRA-09-07-16.pdf>.

Gary Bartlett, "First Person Singular", ELECTIONLINEWEEKLY, May 17, 2013, archived at <https://editions.lib.umn.edu/electionacademy/2013/05/17/outgoing-nc-director-gary-bart/>.

Living History: Meaning of a Vote, Interview with Gary Bartlett, April 6, 2016, https://sites.duke.edu/pjms364s_01_s2016_bartlettvoingpolitics/full-interview-with-gary-bartlett-video-and-transcript/.

Gary Bartlett, North Carolina State Board of Elections, *Standards for Determining What Constitutes a Vote And What Will Be Counted As a Vote Pursuant to 42 U.S.C. § 15481(a)(6) & N.C.G.S. § 163.182.1(b)*, <https://www.ncsbe.gov/Portals/0/FilesP/WhatIsVote.pdf>.

Gary Bartlett, *Former NC elections chief: A wake-up call on elections*, THE TIMES NEWS, May 30, 2020, <https://www.thetimesnews.com/opinion/20200530/former-nc-elections-chief-wake-up-call-on-elections>.

Gary Bartlett, *Options for Administering Ranked Choice Voting in Utah Primary Elections*, RANKED CHOICE VOTING RESOURCE CENTER, 2017, <https://le.utah.gov/interim/2017/pdf/00002422.pdf>.

Gary Bartlett & Robert Montjoy, *Alternative Voting Systems in the U.S.*, August 2017,
<https://drive.google.com/file/d/0B3K2g6lIQMWsT3Ftem1DUldVSkE/view?usp=sharing>.

Gary Bartlett, *Implementing Ranked Choice Voting Statewide and Across Jurisdictions When Multiple Voting Systems Are Used*, RANKED CHOICE VOTING RESOURCES CENTER, September 2017,
<https://drive.google.com/file/d/0B3K2g6lIQMWsZ294RklzNEMyeHc/view>.

**IN THE UNITED STATES DISTRICT COURT
FOR THE MIDDLE DISTRICT OF NORTH CAROLINA**

DEMOCRACY NORTH CAROLINA, THE
LEAGUE OF WOMEN VOTERS OF
NORTH CAROLINA, DONNA PERMAR,
JOHN P. CLARK, MARGARET B. CATES,
LELIA BENTLEY, REGINA WHITNEY
EDWARDS, ROBERT K. PRIDDY II,
WALTER HUTCHINS, AND SUSAN
SCHAFFER.

Plaintiffs,

vs.

THE NORTH CAROLINA STATE BOARD
OF ELECTIONS; DAMON CIRCOSTA, in
his official capacity as CHAIR OF THE
STATE BOARD OF ELECTIONS; STELLA
ANDERSON, in her official capacity as
SECRETARY OF THE STATE BOARD OF
ELECTIONS; KEN RAYMOND, in his
official capacity as MEMBER OF THE
STATE BOARD OF ELECTIONS; JEFF
CARMON III, in his official capacity as
MEMBER OF THE STATE BOARD OF
ELECTIONS; DAVID C. BLACK, in his
official capacity as MEMBER OF THE
STATE BOARD OF ELECTIONS; THE
NORTH CAROLINA DEPARTMENT OF
TRANSPORTATION; J. ERIC BOYETTE,
in his official capacity as
TRANSPORTATION SECRETARY; THE
NORTH CAROLINA DEPARTMENT OF
HEALTH AND HUMAN SERVICES;
MANDY COHEN, in her official capacity as
SECRETARY OF HEALTH AND HUMAN
SERVICES,

Defendants.

Civil Action No. 20-cv-457

**DECLARATION OF MARSHALL TUTOR IN SUPPORT OF PLAINTIFFS’
MOTION FOR PRELIMINARY INJUNCTION**

I, Marshall Tutor, hereby declare as follows:

1. I have nearly 25 years of experience as an investigator in North Carolina. I worked as a Criminal Investigator in the North Carolina Department of Insurance for over four and a half years, a Securities Investigator for the North Carolina Secretary of State Office for over four and a half years, an Elections Investigator for the NC State Board of Elections for 9 years, and then Lead Investigator for the North Carolina State Board of Elections for 6 years. I left the State Board of Elections in 2018.

2. Over the years, I have investigated numerous complaints related to elections in Bladen County.

3. McCrae Dowless has been indicted for election fraud crimes in North Carolina. My investigation of McCrae Dowless and mail-in absentee ballot fraud in Bladen County was a continuous case from 2016 until I left the State Board of Elections in 2018, prior to the 2018 fall general election.

4. In both 2016 and 2018, Mr. Dowless hired people who, often in two-person teams, would visit households that had been mailed absentee ballots by the Bladen County Board of Elections. His teams would show up with marked sample ballots in hand and would encourage these voters to mark their ballots the same way. Dowless's teams would offer to take the ballots and turn them in. Instead, the ballots collected went directly to Mr. Dowless; some made it to the Bladen County Board of Elections and some did not.

5. The ballots were collected with or without witness signatures. When there was no witness signature, Dowless' teams would forge the signatures, and they would sign those ballots out of the presence of the voter. I never detected a forgery just by reviewing the face of the absentee ballot envelope.

6. Mr. Dowless' illegal mail-in absentee ballot fraud enterprise was almost totally dependent on his daily access to the names and addresses of those who requested absentee ballots from the Bladen County Board of Elections. Mr. Dowless was known to have had a very long and cordial relationship with the staff at the Bladen County Board of Elections. He would either call the county board staff or come by on a daily basis to get the list of absentee ballot requests. At that time, the names and addresses of those requesting a mail-in absentee ballot were public record.

7. Now that the law has been changed so that the identities of voters requesting mail-in absentee ballots is not a public record until Election Day, I do not believe anyone can fraudulently manipulate the system as Mr. Dowless did. A person would need an accomplice working in a county board of elections office to break the law in order to get this confidential information.

8. I do not believe a two-witness signature requirement in any way prevents potential fraud such as that conducted by Mr. Dowless' illegal ballot fraud activities. In my 15 years' experience as an investigator with the State Board of Elections, I cannot think of a time or situation in which two absentee ballot witness signatures would have prevented absentee ballot fraud.

I declare under penalty of perjury under the laws of the United States of America
that the foregoing is true and correct to the best of my knowledge.

Executed this 3rd of June, 2020.

/s/ Marshall Tutor

Marshall Tutor

**IN THE UNITED STATES DISTRICT COURT
FOR THE MIDDLE DISTRICT OF NORTH CAROLINA**

DEMOCRACY NORTH CAROLINA, THE
LEAGUE OF WOMEN VOTERS OF
NORTH CAROLINA, DONNA PERMAR,
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EDWARDS, ROBERT K. PRIDDY II,
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ELECTIONS; DAVID C. BLACK, in his
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STATE BOARD OF ELECTIONS; THE
NORTH CAROLINA DEPARTMENT OF
TRANSPORTATION; J. ERIC BOYETTE,
in his official capacity as
TRANSPORTATION SECRETARY; THE
NORTH CAROLINA DEPARTMENT OF
HEALTH AND HUMAN SERVICES;
MANDY COHEN, in her official capacity as
SECRETARY OF HEALTH AND HUMAN
SERVICES,

Defendants.

Civil Action No. 20-cv-457

**DECLARATION OF CHRISTOPHER KETCHIE IN SUPPORT OF
PLAINTIFFS' MOTION FOR PRELIMINARY INJUNCTION**

I, Christopher Ketchie, hereby declare:

1. All facts set forth herein are based on my personal knowledge, and if called upon to testify as to the contents of this Declaration, I could and would do so.

2. I am a demographer and data analyst for Southern Coalition for Social Justice, where I specialize in research, analysis, and spatial visualization of demographic and electoral data.

3. In this matter, I have used public data sets to isolate certain statistics for reference in the Complaint and the Brief in Support of Plaintiffs' Motion for Preliminary Injunction.

4. To determine changes in voter registration rates between 2016 and 2020, I used the *NVRA Data (2008 to present)* (last updated June 2, 2020), published by the North Carolina State Board of Elections and available at https://s3.amazonaws.com/dl.ncsbe.gov/NVRA/nvra_stats_all.txt. The data file is accessible by going to <https://www.ncsbe.gov/Public-Records-Data-Info/Election-Results-Data>, and navigating to "FTP Site" → "NVRA" → "nvra_stats_all.txt." By summing the "Count" field for total registrations (new, changed, and duplicate) and aggregating by year and month (using the "NVRA Date" field) for each month in 2016 and 2020, I determined that January 2020 had a 162% increase in registrations compared to 2016, while February, March, and April 2020 had changes of -10%, -14%, and -50% compared to the same months of 2016 respectively.

5. To determine the rate of absentee mail-in ballots rejected for the March 2020 North Carolina primary, I used data from the *March 3, 2020 Absentee File*, published by

the North Carolina State Board of Elections and available at https://s3.amazonaws.com/dl.ncsbe.gov/ENRS/2020_03_03/absentee_20200303.zip. This data file is accessible by going to <https://www.ncsbe.gov/Public-Records-Data-Info/Election-Results-Data> and navigating to “FTP Site” → “ENRS” → “2020_03_03” → “absentee_20200303.zip”. By aggregating absentee mail-in ballots by ballot return status in the “ballot_rtn_status” field (either accepted or reason for rejection), and dividing those rejected by the total, I determined that almost 15% (14.6%) of submitted absentee mail-in ballots were rejected. The statistics generated from the absentee file do not include absentee by mail ballots that were either requested and not sent to the voter or sent to the voter but not returned to the State Board of Elections (i.e. those with a null value in the “ballot_rtn_status” field).

6. To determine the percent of voters who cast mail-in absentee ballots in the 2016 general election, I used data from *November 8, 2016 History Statistics*, published by the North Carolina State Board of Elections and available at https://s3.amazonaws.com/dl.ncsbe.gov/ENRS/2016_11_08/history_stats_20161108.zip. This data file is accessible by going to <https://www.ncsbe.gov/Public-Records-Data-Info/Election-Results-Data> and navigating to “FTP Site” → “ENRS” → “2016_11_08” → “history_stats_20161108.zip”. By aggregating all votes cast by voting method in the “voting_method_desc” field, and dividing those with the “ABSENTEE BY MAIL” category by that aggregate, I determined that 4% of voters cast mail-in absentee ballots in the 2016 general election.

7. To determine the percent of precincts in North Carolina that have over 5,000

voters, I used data from *Voter Registration File* (Last updated May 30, 2020), published by the North Carolina State Board of Elections and available at https://s3.amazonaws.com/dl.ncsbe.gov/data/ncvoter_Statewide.zip. This data file is accessible by going to <https://www.ncsbe.gov/Public-Records-Data-Info/Election-Results-Data> and navigating to “FTP Site” → “data” → “ncvoter_Statewide.zip”. By aggregating voters by county and precinct using the “county_desc” and “precinct_abbrev” fields, and sorting by total voters, I determined that 216 precincts in North Carolina have 5,000 or more voters.

I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct to the best of my knowledge.

Executed this 4th day of June, 2020



/s/

Christopher Ketchie

**UNITED STATES DISTRICT COURT
FOR THE MIDDLE DISTRICT OF NORTH CAROLINA**

DEMOCRACY NORTH CAROLINA, THE
LEAGUE OF WOMEN VOTERS OF
NORTH CAROLINA, DONNA PERMAR,
JOHN P. CLARK, MARGARET B. CATES,
LELIA BENTLEY, REGINA WHITNEY
EDWARDS, ROBERT K. PRIDY II,
WALTER HUTCHINS, AND SUSAN
SCHAFFER.

Plaintiffs,

vs.

Civil Action No. 20-cv-457

THE NORTH CAROLINA STATE BOARD
OF ELECTIONS; DAMON CIRCOSTA, in
his official capacity as CHAIR OF THE
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NORTH CAROLINA DEPARTMENT OF
HEALTH AND HUMAN SERVICES;
MANDY COHEN, in her official capacity as
SECRETARY OF HEALTH AND HUMAN
SERVICES,

Defendants.

**DECLARATION OF ALLISON J. RIGGS IN SUPPORT OF PLAINTIFFS'
MOTION FOR PRELIMINARY INJUNCTION**

I, Allison J. Riggs, hereby declare:

1. All facts set forth herein are based on my personal knowledge, and if called upon to testify as to the contents of this Declaration, I could and would do so.

2. I am the Interim Executive Director and Chief Counsel for Voting Rights at Southern Coalition for Social Justice.

3. Attached hereto as **Exhibit 1** is a true and correct copy of a letter dated March 26, 2020, from Defendant Karen Brinson Bell, Executive Director of the North Carolina State Board of Elections, to Governor Roy Cooper and General Assembly leadership regarding “Recommendations to Address Election-Related Issues Affected by COVID-19,” in which she requests, *inter alia*: (i) expanding options for voters to submit mail-in absentee ballot requests beyond the current mail-only option to enable requests by fax, email, and an online portal; (ii) establishing a fund to pay for postage for returned absentee ballots; (iii) reducing or eliminating the requirements that two witnesses sign an absentee mail container envelope in order for the ballot to be counted; (iv) lifting the requirement that a majority of Election Day poll workers reside in the precinct in which they work; and (v) lifting the uniformity requirement for early voting sites, days and hours.

4. Attached hereto as **Exhibit 2** is a true and correct copy of a letter dated April 22, 2020, from Defendant Bell to Governor Roy Cooper and General Assembly leadership regarding “CARES Act Request and Clarification to Recommendations to Address Election-Related Issues Affected by COVID-19.”

5. Attached hereto as **Exhibit 3** is a true and correct copy of a letter dated

April 29, 2020, from Board of Elections Members in Congressional District 11 to General Assembly Leaders, Election Committee Members, and Western North Carolina Legislators.

6. Attached hereto as **Exhibit 4** is a true and correct copy of *Statement on the second meeting of the International Health Regulations (2005) Emergency Committee Regarding the Outbreak of Novel Coronavirus (2019-nCoV)* published by the World Health Organization and available at [https://www.who.int/news-room/detail/30-01-2020-statement-on-the-second-meeting-of-the-international-health-regulations-\(2005\)-emergency-committee-regarding-the-outbreak-of-novel-coronavirus-\(2019-ncov\)](https://www.who.int/news-room/detail/30-01-2020-statement-on-the-second-meeting-of-the-international-health-regulations-(2005)-emergency-committee-regarding-the-outbreak-of-novel-coronavirus-(2019-ncov)).

7. Attached hereto as **Exhibit 5** is a true and correct copy of *People who are at higher risk for severe illness*, published by the Center for Disease Control and Prevention (“CDC”) and available at <https://www.cdc.gov/coronavirus/2019-ncov/specific-groups/people-at-higher-risk.html>.

8. Attached hereto as **Exhibit 6** is a true and correct copy of Remarks by President Trump, Vice President Pence, and Members of the Coronavirus Task Force (Mar. 25, 2020) from a White House Press Briefing and available at <https://www.whitehouse.gov/briefings-statements/remarks-president-trump-vice-president-pence-members-coronavirus-task-force-press-briefing-11/>.

9. Attached hereto as **Exhibit 7** is a true and correct copy of *CDC Director Warns Second Wave of Coronavirus Might be ‘More Difficult’* (Apr. 21, 2020), published by the Hill and available at <https://thehill.com/policy/healthcare/493973-cdc-director-warns-second-wave-of-coronavirus-might-be-more-difficult>.

10. Attached hereto as **Exhibit 8** is a true and correct copy of Governor Roy Cooper's Exec. Order No. 141 (May 20, 2020), available at <https://htv-prod-media.s3.amazonaws.com/files/eo141-phase-2-1590009188.pdf>.

11. Attached hereto as **Exhibit 9** is a true and correct copy of *NCDMW Announces Driver License Office Changes during COVID-19 Outbreak* (last updated June 2, 2020), published by the North Carolina Department of Transportation, and available at <https://www.ncdot.gov/news/press-releases/Pages/2020/2020-03-17-ncdmv-driver-license-impact-coronavirus.aspx>. The page states that as of June 2, 2020, there are 60 Department of Motor Vehicles ("DMV") offices that are closed.

12. Attached hereto as **Exhibit 10** is a true and correct copy of a February 28, 2020 Letter from Disability Rights North Carolina to members of the Davidson County Board of Elections and the General Counsel for the North Carolina State Board of Elections regarding Davidson County's failure to assemble a Multipartisan Assistance Team to help a voter residing in a skilled nursing facility in Davidson County.

13. Attached hereto as **Exhibit 11** is a true and correct copy of *An Act to Provide Aid to North Carolinians in Response to the Coronavirus Disease (COVID-19) Crisis*, Sl. 2020-3 §4.1(c) (May 4, 2020), available at <https://www.ncleg.gov/EnactedLegislation/SessionLaws/PDF/2019-2020/SL2020-3.pdf>. The Senate bill states, "Nothing in this section shall apply to any notarization under Article 20 of Chapter 163 of the General Statutes [regarding absentee ballots].". *Id.* at 31.

14. Attached hereto as **Exhibit 12** is a true and correct copy of a North

Carolina Absentee Application and Certificate, made available by Pitt County, North Carolina at https://www.pittcountync.gov/DocumentCenter/View/8432/Absentee-Envelope_EL_v3.

15. Attached hereto as **Exhibit 13** is a true and correct copy of a Federal Write-in Absentee Ballot, made available by the Federal Voting Assistance Program at <https://www.fvap.gov/uploads/FVAP/Forms/fwab2013.pdf>, p. 3.

16. Attached hereto as **Exhibit 14** is a true and correct copy of *Recommendations for Election Polling Locations*, published by the CDC and available at <https://www.cdc.gov/coronavirus/2019-ncov/community/election-polling-locations.html>.

17. Attached hereto as **Exhibit 15** is a true and correct excerpt of The 2014 EAC Election Administration and Voting Survey Comprehensive Report (Table 39), published by the U.S. Election Assistance Comm'n and available at https://www.eac.gov/sites/default/files/eac_assets/1/1/2014_EAC_EAVS_Comprehensive_Report_508_Compliant.pdf.

18. Attached hereto as **Exhibit 16** is a true and correct copy of *Voting Rights and Election Administration in North Carolina: Field Hearing Before the Subcomm. on Elections of the H. Comm. on House Administration* (Apr. 18, 2019), available through the testimony of Tomas Lopez, Exec. Dir., Democracy North Carolina at <https://docs.house.gov/meetings/HA/HA08/20190418/109315/HHRG-116-HA08-Wstate-LopezT-20190418.pdf>.

19. Attached hereto as **Exhibit 17** is a true and correct copy of *Bipartisan Furor as North Carolina Election Law Shrinks Early Voting Locations by Almost 20 Percent*

(Sept. 24, 2018), written by Blake Peterson and published by ProPublica, and available at <https://www.propublica.org/article/bipartisan-furor-as-north-carolina-election-law-shrinks-early-voting-locations-by-almost-20-percent><https://www.propublica.org/article/bipartisan-furor-as-north-carolina-election-law-shrinks-early-voting-locations-by-almost-20-percent>.

20. A compilation of files related to precinct closures for the upcoming Congressional District 11 Second Republican Primary was published by the North Carolina State Board of Elections in response to a public records request dated May 14, 2020, and these files are available at [https://dl.ncsbe.gov/index.html?prefix=Public_Records_Requests/June%202023%20Second%20Primary temporary precinct transfers/](https://dl.ncsbe.gov/index.html?prefix=Public_Records_Requests/June%202023%20Second%20Primary_temporary_precinct_transfers/). Among these documents are letters from the count boards of elections of Yancy, Madison, and Jackson counties indicating that lack of poll workers contributed to the need to consolidate, and a letter from Macon County Board of Elections requesting to consolidate 12 precincts into one site. *See Exhibits 18, 19, 20, and 21.*

21. Attached hereto as **Exhibit 22** is a true and correct copy of *State Board, DMV Partner to Expand Online Voter Registration Service* (Mar. 30, 2020), published by N.C. State Board of Elections, and available at https://www.ncsbe.gov/Press-Releases?udt_2226_param_detail=2195.

22. Attached hereto as **Exhibit 23** is a true and correct copy of North Carolina's COVID-19 Response for Individuals and Families (last accessed Jun. 4, 2020), published by N.C. Department of Health and Human Services, and available at

<https://www.ncdhhs.gov/divisions/public-health/covid19/individuals-and-families>.

23. I am aware that, in a May 15, 2020 meeting of the North Carolina State Board of Elections, Executive Director Karen Brinson Bell announced that the State Board had ordered Personal Protective Equipment for those counties participating in the June 23 second Republican primary in Congressional District 11, including masks, unique pens for voters, cleaners and wipes, and gloves and face shields for poll workers.

I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct to the best of my knowledge.

Executed this 4th day of June, 2020.



/s/

Allison Riggs

EXHIBIT 1

Letter from Karen Brinson Bell, Executive Director,
N.C. State Board of Elections, to Governor Roy
Cooper et al. (Mar. 26, 2020)



NORTH CAROLINA

STATE BOARD OF ELECTIONS

Mailing Address:
P.O. Box 27255, Raleigh, NC 27611
(919) 814-0700 or
(866) 522-4723
Fax: (919) 715-0135

TO: Governor Roy Cooper; Speaker Tim Moore; President Pro Tempore Phil Berger; Joint Legislative Elections Oversight Committee; Joint Legislative Oversight Committee on General Government; and House Select Committee on COVID-19, Continuity of State Operations Working Group

FROM: Karen Brinson Bell, Executive Director

RE: Recommendations to Address Election-Related Issues Affected by COVID-19

DATE: March 26, 2020

The spread of the novel coronavirus (COVID-19) impacts the conduct of elections and daily operations for the State Board of Elections (State Board) and county boards of elections. In response, our agency has taken a number of actions in recent days and weeks to address election-related impacts of the pandemic and inform the public about our efforts. These include:

- An emergency [Executive Order](#) issued on March 20, 2020, that, among other things, rescheduled the Republican second primary in Congressional District 11 from May 12, 2020, to June 23, 2020.
- An amended Administrative Rule 08 NCAC 01 .0106, by both [emergency](#) and proposed [temporary](#) rulemaking, to clarify the Executive Director's statutory authority to exercise emergency powers to conduct an election in a district where the normal schedule for the election is disrupted by a natural disaster, extremely inclement weather, or armed conflict. The amendment clarifies that a catastrophe arising from natural causes includes a disease epidemic or other public health incident that makes it impossible or extremely hazardous for elections officials or voters to reach or otherwise access the voting place or that creates a significant risk of physical harm to persons in the voting place, or that would otherwise convince a reasonable person to avoid traveling to or being in a voting place.
- [Numbered Memo 2020-11](#), released on March 15, 2020, provides guidance on immediate actions that may be taken by authority of the Executive Director and other steps that may be taken by county boards of elections.
- Establishment of a working group of State and county election officials to consider immediate steps that should be taken for the conduct of the federal second primary and also more long-term steps including legislative requests to administer elections in times of disease epidemics, necessary measures if mail balloting were expanded, and efforts that must be taken to ensure the health and well-being of voters and workers during in-person voting.
- A [statement](#) released by the NCSBE on March 12, 2020.

While the State Board will continue to administer elections in the wake of COVID-19 within our current legal authority, the State Board respectfully recommends the General Assembly consider making the following statutory changes to address the impacts of the coronavirus pandemic on our elections. We believe that, in order to ensure continuity and avoid voter confusion, the changes should be made permanent, except where indicated otherwise.

- **Expand options for absentee requests.** We recommend allowing a voter to submit an absentee ballot request form by fax and email. Current law restricts the return of the absentee request form to the voter and the voter's near relative or legal guardian, and restricts the methods by which the requests can be returned to in-person or by mail or designated delivery service. We also recommend a limited exception to G.S. § 163-230.2(e)(2) to allow county boards of elections to pre-fill a voter's information on an absentee request form. The voter or near relative would still be required to sign the form, but this change would allow voters who are home due to COVID-19 to request an absentee request form by phone and have a pre-filled form sent to them rather than having to travel to the county board office to receive assistance.
- **Establish online portal for absentee requests.** The State Board expects a large increase in the number of voters who choose to vote absentee by mail this year, and creating an online portal for absentee voting would make it easier for voters to request an absentee ballot from home. The voter or near relative would provide identifying information (including the voter's date of birth and the last four digits of the voter's Social Security or drivers license number), and an electronic signature as defined in G.S. § 66-312 of the Uniform Electronic Transaction Act would be permitted. An allocation of funds to purchase a program or application to support this functionality may be needed.
- **Allow a voter to include a copy of a HAVA document with their absentee request form if the voter is unable to provide their drivers license number or last four digits of their Social Security number.** We recommend allowing a voter who did not include their drivers license number or the last four digits of their Social Security number the option to include a copy of a current utility bill, bank statement, government check, paycheck, or other government document showing the name and address of the voter. Making this change to G.S. § 163-230.2 would make it easier for those who wish to vote absentee by-mail to do so. The State Board has received multiple reports from county boards of elections and from voters that, without this option, some voters are no longer able to request an absentee ballot. This particularly affects senior citizens who may not have a drivers license number and cannot recall or do not have access to their Social Security number. Allowing this option will make it easier for those most at risk of contracting COVID-19 to vote absentee by mail.
- **Establish a fund to pay for postage for returned absentee ballots.** Elections officials across the nation are anticipating a surge in absentee voting in light of

restrictions on movement imposed due to the spread of COVID-19. Prepaid postage would increase the likelihood that a voter would return their ballot, would eliminate the need for a voter to leave their home to purchase postage, and would also decrease any incentive for a voter to turn their ballot over to someone else. Prepaid postage for the return of absentee ballots would also further enable residents and patients of facilities such as nursing homes and group homes to return their ballots safely, easily, and with minimal human contact.

- **Reduce or eliminate the witness requirement.** In light of social distancing requirements to prevent the spread of COVID-19, we recommend reducing the witness requirement for the certification on absentee container-return envelopes. Currently, a voter must have their absentee envelope signed by two witnesses or one notary. North Carolina residents are currently being asked to stay at home, and without a timeline for when the disease will be under control, requiring only one witness would reduce the likelihood that a voter would have to go out into the community or invite someone to their home to have their ballot witnessed. Eliminating the witness requirement altogether is another option and would further reduce the risk.
- **Modify procedure for counting of ballots on Election Day.** To allow county boards of elections more time to process the anticipated surge in absentee ballots, we recommend amending the law to provide that ballots received by the Saturday prior to the election must be counted on Election Day, and all other absentee ballots that are timely received will be counted on the day of the canvass. Currently, G.S. § 163-234(2) requires county boards to meet on Election Day to count all absentee ballots received by 5:00 p.m. on the day before the election. Changing the timeframe for when absentee ballots are counted would help ease the burden of an increased volume of absentee ballots, especially in larger counties. This change would not affect the deadline for the county boards to receive absentee ballots, nor would it affect which ballots are counted; rather, it would ameliorate the anticipated increase in absentee ballots received by county boards between the Saturday before the election and 5:00 p.m. on the day before the election. As part of this change, we also recommend extending county canvass to 14 days after the election, rather than 10 days after the election as provided in G.S. § 163-182.5(b), to allow county boards of elections sufficient time to count the large number of ballots that are anticipated being received; State Board canvass would also need to be extended accordingly.
- **Temporarily modify restrictions on assistance in care facilities.** Currently, G.S. § 163-226.3(a)(4) makes it a Class I felony for an owner, director, manager, or employee of a hospital, clinic, nursing home, or adult care home to assist a voter in that facility in requesting, voting, or returning the voter's absentee ballot. There are important reasons to discourage facility employees from assisting patients and residents with their absentee requests and with voting their ballots. However, many localities are currently restricting or banning visitors to facilities, and an [Executive Order](#) issued by the Governor prevents visitors altogether to reduce the spread of COVID-19. With this in mind, it may not be possible for

multipartisan assistance teams (MATs), or others who would traditionally assist facility residents, to provide assistance. Individuals may also be unwilling to serve on MATs due to the increased risk of transmission of COVID-19 at a facility. Many voters in these facilities do require help with requesting, voting, and/or returning their ballots, and with no option available for assistance they may effectively be disenfranchised. We suggest considering options, such as temporarily allowing a facility employee to assist, to ensure these voters are able to continue to exercise their right to vote.

- **Clarify authorization for telephonic meetings.** It would be helpful to clarify that telephonic meetings and meetings held by other remote means are specifically authorized by the open meetings law. State Board counsel construe Article 33C of Chapter 143 to permit telephonic and other remotely held meetings. However, the UNC School of Government has a [different interpretation](#) of the law based on its stated familiarity with the law's history.
- **Expand student pollworker program.** We are recommending expanding the student pollworker program to allow students to fill the role of judge or chief judge, to allow juniors or seniors to serve as long as they are at least 16 years old, and to allow service as a pollworker to count as an approved school trip. Chief judges and judges would still be appointed from recommendations provided by the political parties. Currently, G.S. § 163-42.1 requires students be at least 17 years old and only allows them to serve in the role of precinct assistant. It also requires the principal of the student's school to recommend the student; we suggest this section include an exception to that requirement if the school is closed. These changes would increase the county boards of elections' recruitment of students, who tend to be less at risk of COVID-19. The changes will be especially necessary if large numbers of pollworkers are unable to serve. The average age of pollworkers in North Carolina is around 70 and the role requires significant interaction with the public, so we anticipate that pollworkers in at-risk categories may be advised not to serve or may be unable to serve this year.
- **Make Election Day a holiday.** Designating Election Day as a State holiday would expand the potential pool of pollworkers to students, teachers, and younger individuals. It would also encourage state and county employees to work the polls. These groups tend to be in a lower-risk category for COVID-19 and therefore would be an asset given current concerns. An alternative option would be to provide paid leave for state and county employees who serve as pollworkers and providing course credit for student pollworkers.
- **Increase pay for pollworkers.** Precinct officials safeguard the democratic process and help ensure confidence in the system. Increasing pay for pollworkers will help county boards of elections recruit and retain a strong elections workforce this year and for years to come. Current pay for precinct officials is the state minimum wage, \$7.25 per hour. G.S. § 163-46. On Election Day, pollworkers must serve for the entire day without leaving the site—a shift of more than 14 hours. The minimum wage requirement was put in place in 1981 (see Session

Law 1981-796). Ensuring that pollworkers' unemployment benefits are not affected by their service is another way to increase recruitment efforts.

- **Eliminate requirement that a majority of pollworkers reside in precinct.** Eliminating the requirement in G.S. § 163-41(c) that a majority of pollworkers at a polling place must reside in the precinct would provide county boards of elections with greater flexibility to staff their precincts. It would increase the likelihood a county board of elections would be able to keep a polling place open rather than having to combine it with another polling place to meet the residency requirement.
- **Temporarily suspend purchase and contract requirements for elections-related supplies and other items.** To allow the State Board and county boards to continue operating in a time when many business and government entities have reduced capacity or have closed, temporarily lifting the purchase and contract requirements of Article 3 of Chapter 143 in 2020 would significantly speed up the ability to procure necessary supplies.
- **Match HAVA funds.** In order to receive federal elections security funds that were authorized in late 2019, the State must make a 20% match. This funding will be indispensable in our agency's continued effort to secure North Carolina's elections. This is true even more so as we react and respond to the pandemic, since times of crisis and uncertainty increase the threats of cyber attacks, phishing attempts, and scams. Federal authorities have also indicated these funds may be used for COVID-19 response efforts such as cleaning supplies and protective masks for staff and pollworkers, resources to meet an unanticipated increased demand for mail ballots due to self-isolation and quarantine in response to COVID-19, and temporary staff to process the increased absentee ballot demand. Funds may also be used for costs incurred to communicate law changes, such as changes in absentee-by-mail ballot rules, that could result from the pandemic. Exempting HAVA-funded positions at the State Board from a possible hiring freeze would also be important to ensuring the agency is able to continue to secure the statewide voter registration database and many other duties to protect North Carolina's elections from cyber threats.
- **One-Stop.** Consider whether changes to one-stop requirements, such as site and hour requirements, may be needed in light of the uncertainty regarding containment of the COVID-19 pandemic by the early voting period in October 2020. Currently, if any one-stop site is open all one stop-sites must be open and all sites other than the county board office must be open 8:00 a.m. to 7:30 p.m. County boards of elections need flexibility to determine hours because they are affected differently by, and respond differently to, the COVID-19 pandemic.

While the situation with COVID-19 is changing on a daily and sometimes hourly basis, we believe the above recommendations will help the elections that form the basis of North Carolina's democracy remain strong and resilient in these uncertain times.

We are appreciative of the appointment of the House Select Committee on COVID-19, Continuity of State Operations Working Group, and I stand ready to answer your questions or provide any other information that may be useful in consideration of these recommendations.

Sincerely,

A handwritten signature in blue ink, appearing to read "Karen Brinson Bell". The signature is fluid and cursive, with a small mark at the end.

Karen Brinson Bell
Executive Director
State Board of Elections

EXHIBIT 2

Letter from Karen Brinson Bell, Executive Director,
N.C. State Board of Elections, to Governor Roy
Cooper et al. (Apr. 22, 2020)



KAREN BRINSON BELL
Executive Director

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Raleigh, NC 27611

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(866) 522-4723

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(919) 715-0135

TO: Governor Roy Cooper; Speaker Tim Moore; President Pro Tempore Phil Berger; Joint Legislative Elections Oversight Committee; Joint Legislative Oversight Committee on General Government; House Select Committee on COVID-19, Continuity of State Operations Working Group; House Democratic Leader Darren Jackson; Senate Democratic Leader Dan Blue

FROM: Karen Brinson Bell, Executive Director

RE: CARES Act Request and Clarification to Recommendations to Address Election-Related Issues Affected by COVID-19

DATE: April 22, 2020

We write to provide you with updated information regarding our [legislative requests](#) made on March 26, 2020, including estimated costs and the timeframes for when changes would need to be made. We are also writing to provide additional detail about the Coronavirus Aid, Relief, and Economic Security (CARES) Act requirements that we received last week. On April 6, 2020, we were informed of North Carolina's award of \$10,897,295 under the CARES Act, which was appropriated "to prevent, prepare for, and respond to coronavirus, domestically or internationally, for the 2020 Federal election cycle." The State match requirement is 20%, or \$2,179,459.

We have completed two trainings to better understand how the match may be met and how the funds may be applied. Some key points are:

- The funds are for additional costs, either new or increased, associated with the national emergency related to coronavirus.
- All funds must be spent or incurred by December 31, 2020 or returned to the federal government.
- Pre-award costs may be included if they were incurred on or after January 20, 2020.
- The State match may be funded over two years and may also be met:
 - By direct funding of the State;
 - By indirect or direct costs incurred by the State Board of Elections, county boards of elections, and/or partners supporting state or county election boards to conduct elections through this pandemic; and/or,
 - Through in-kind contributions. We are working with the National Association of State Election Directors to identify hand sanitizer and other supplies that may be provided free of charge if available.

To date, we have identified \$58,962 already incurred by the State Board of Elections, county boards of elections, and supporting entities that can be credited towards the State's match. This includes \$38,031 in indirect costs incurred by the State Board of Elections; \$14,931 in direct costs incurred by the county boards of elections; and \$6,000 in in-kind donations.

We therefore are requesting state funding of \$2,120,497 to receive the \$10+ million awarded to North Carolina.

Through these funds we can offset significant new and increased costs to the counties because of a projected 30% to 40% voter absentee-by-mail participation rate (compared to a 4% to 5% rate traditionally), the need to more thoroughly sanitize and improve hygiene methods during one-stop early voting and on Election Day, and to address possible poll worker shortage due to illness or reluctance or inability to serve. The CARES Act funds would directly assist counties through bulk purchases, state purchase and distribution to the counties, or through reimbursement, and could include but are not limited to the cost of:

- One-time-use pens and styluses for each voter, or sanitization of reusable supplies
- Hand sanitizer and masks for voters, poll workers, and election staff
- Social distancing tools and protective devices such as face shields, stanchions and plexiglass shields at check-in stations
- Facility rental fees to assist counties in moving to sites large enough to accommodate social distancing, including former department stores or grocery stores, if available
- Facility cleaning fees before, during, and after the election
- Increased postage costs due to a higher volume of absentee-by-mail requests
- Mail tracking software to help the voter understand where their ballot is in the process and to help the counties prepare for the volume of incoming returned ballots
- Cost of additional absentee-by-mail envelopes and other supplies

Just to conduct the General Election statewide on Election Day, we will operate nearly 2,700 voting sites with approximately 18,000 workers employed for 14 to 16 hours. We are preparing for more than 4.5 million voters to vote in-person or by-mail in this election. To ensure the health and safety of the voters and workers, the costs add up quickly. And while we would like to think that coronavirus will be a distant memory by November, we must prepare to address lingering fears, new social norms, and the possibility that the virus could reoccur seasonally as do influenza and other viruses. As elections officials, we must prepare for the worst-case scenario to ensure that voters are able to cast their ballots. All of this means we need legislative approval for the associated State match to move forward with the CARES Act funding.

Procuring and purchasing these supplies must happen now to ensure delivery by July when counties will begin to assemble their supply kits, train poll workers, and receive orders from print houses. We must also be mindful that all 50 states and territories will be implementing similar procedures for the same Election Day and the supply chain is very stressed to meet the demands.

For these reasons, we also request that the General Assembly move forward with the following recommendations during the special session beginning April 28, 2020. These are immediate needs that apply to the 11th Congressional District Republican Second Primary, the new Columbus County Commissioner District 2 Republican Primary, and the 2020 General Election. Particular to the General Election, because of the high expected turnout for a presidential general election, supplies must be ordered, printing changes must be submitted and scheduled with print houses, and other changes or orders should be completed by June 15, 2020 to meet deadlines associated with that election, which starts with absentee-by-mail voting on September 4, 2020. The recommendations needing immediate consideration for all three elections are:

- **Match CARES Act funds** as outlined above.
- **Match HAVA funds** as outlined in my [March 26, 2020 letter](#).
- **Temporarily suspend purchase and contract requirements for elections-related supplies and other items.** Because of the time limitations and amount of supplies needed to protect voters and pollworkers from COVID-19, the State Board and county boards may have difficulty complying with procurement processes without the temporary suspension. This change would need to happen right away as we are currently attempting to procure many supplies due to the upcoming second primary and the shortages that have occurred with so many states competing for resources.
 - No additional expected cost
- **Expand options for absentee requests (allow requests by fax and email).** We recommend allowing a voter to submit an absentee ballot request form by fax and email to allow voters to submit their absentee requests without leaving their home or needing to purchase stamps or envelopes. This change needs to be made as soon as possible as voters may already request absentee ballots for the June 23 and November 3 elections.
 - No additional expected cost
- **Allow a voter to include a copy of a HAVA document with their absentee request form if the voter is unable to provide their driver's license number or last four digits of their Social Security number.** Restoring this option will make it easier for those most at risk of contracting COVID-19 to vote absentee by-mail. This change is needs to be made as soon as possible as voters may already request absentee ballots for the June 23 and November 3 elections.
 - No additional expected cost
- **Reduce or eliminate the witness requirement for absentee ballots.** Most voters, under current law, would have to invite another adult into the voter's home to complete the voting process since most voters do not live with two other individuals age 18 or older. This increases the risk of transmission or exposure to disease. By reducing the witness requirement to one witness during a disease epidemic, we can effectively conduct

absentee-by-mail voting while reducing a voter's risk of disease. Additionally, it should be noted that we continue to support restricting the return of absentee-by-mail ballots to the voter or near relative as enacted by Session Law 2019-239. It is necessary to make the change now in order to update the absentee instructions and return envelope, since these will need to be redesigned by June and printed in early July to ensure the counties can meet the start of absentee-by-mail voting on September 4, 2020.

An alternative option, and one that could be carried out beyond the 2020 General Election, is to consider signature matching software. Software is available to compare the voter's signature on file to the signature provided on the absentee-ballot return envelope. Moving to this verification process would eliminate the need for witnesses.

- No additional expected cost to reducing witness requirement. Software would have added cost, but we do not yet have information about the expected cost.
- **Temporarily modify restrictions on assistance in care facilities.** Many localities are currently restricting or banning visitors and family members to facilities, and an [Executive Order](#) issued by the Governor prevents visitors altogether to reduce the spread of COVID-19. Additionally, across the state, care facilities have tragically experienced large numbers of coronavirus cases and deaths. We do not know what the conditions will be like when absentee voting occurs from September to November this year. With this in mind, it may not be possible for multipartisan assistance teams (MATs), or others who would traditionally assist facility residents, to provide assistance. Many voters in these facilities do require help with requesting, voting, and/or returning their ballots, and with no option available for assistance, they may effectively be disenfranchised. We suggest considering options, such as temporarily allowing a facility employee to assist, to ensure these voters are able to continue to exercise their right to vote. Similar to states like Indiana, two trained facility employees not of the same political party could be designated to administer voting and could be trained accordingly by the county board prior to serving in this capacity. Election officials could then transport materials to and from the facility with chain of custody procedures documenting the acceptance of materials by the designated facility administrators. It is necessary to make this change as soon as possible to designate and train appropriate individuals to serve in facilities.
 - No additional expected cost
- **Expand student pollworker program and eliminate requirement that a majority of pollworkers reside in the precinct.** We recommend this change be made immediately because there are shortages in some polling places in the 11th Congressional District Republican Second Primary and the new Columbus County Commissioner District 2 Republican Primary that may require transferring voters to another precinct.
 - No additional cost expected

We also request the General Assembly move forward with the following recommendations during the special session beginning April 28, 2020. These are immediate needs, but it is not possible to implement them for the 11th Congressional District Republican Second Primary and the new Columbus County Commissioner District 2 Republican Primary. Because of deadlines associated with the 2020 General Election, however, there is an immediate need to prepare for a coronavirus response:

- **Establish online portal for absentee requests.** This change would need to be made immediately due to the time required to acquire software, modify the State Board of Elections' Statewide Elections Information Management System (SEIMS), and inform the public of the change prior to the start of absentee voting on September 4, 2020.
 - We have received a quote from a vendor who supports numerous states and jurisdictions throughout the country. Based upon the volume projected for North Carolina, the annual license fee is \$398,000 with a pre-election configuration fee of \$25,950.
- **Establish a fund to pay for postage for outbound and returned absentee ballots.** We would request any funds be allocated as soon as possible to allow county boards of elections to budget for the election and in light of the budgetary reductions they are already being requested to make at the county level.
 - The estimate for prepaid postage for the November general election, based upon 65% of registered voters participating in the election and 40% of those participating by mail, would be \$3,640,000, at a cost of approximately \$2 total per ballot (7 million voters x 65% overall participation=4,550,000 participating voters with 40% participating by mail=1,820,000 by mail ballots). This prepaid cost would include both the outgoing and incoming postage cost. Envelope size and weight may affect this estimate.
- **Modify one-stop site and hour requirements.** We recommend any changes be made as soon as possible to allow time for county boards of elections to locate and procure appropriate sites, a process that has already begun for the November 3 election.
 - We expect a change would reduce costs for the county boards of elections. Due to the uncertainty of any possible change, it is not currently possible to estimate the savings.

We appreciate the dialogue we have had with many of you through this process and uncharted waters. Our goal is to “prepare for the worst” in hopes that we are overly prepared. Elections administration, as we have discussed, is a planning and logistics operation. The bulk of an election is executed before voting ever begins, which is why we come before you now. If we can secure the funds needed and know any legislative changes that may occur, then we can better prepare and deliver successful elections under normal conditions or in times of crisis.

I stand ready to answer your questions or provide any other information that may be useful in consideration of these funding requests and recommendations.

Sincerely,

A handwritten signature in blue ink, appearing to read "Karen Brinson Bell".

Karen Brinson Bell
Executive Director
State Board of Elections

EXHIBIT 3

Letter from Board of Elections Members in
Congressional District 11 to General Assembly
Leaders et al. (Apr. 29, 2020)

CONGRESSIONAL DISTRICT 11 BOARDS OF ELECTIONS

c/o Kathy Ray, Madison County Board of Elections

Marshall, NC 28753

Phone: 828-649-3731

Email: madison.boe@madisoncountync.gov

April 27, 2020

Dear General Assembly Leaders, Election Committee Members, and Western NC Legislators,

We write as Republican and Democratic members of the county boards of elections in Congressional District 11 with an urgent request.

As we prepare to administer the runoff election (Second Primary) on June 23, we are learning that many of our regular poll workers are reluctant to serve. A large percent of them are elderly and are genuinely concerned about their health. In addition, some of our polling places are now being used by other agencies for emergency purposes. If we must change or combine polling places because of a poll worker shortage or a need for alternative locations, we must place a public notice in the media by May 9th and must mail notices to all affected voters by May 23rd.

Under current law, a majority of poll workers must reside in the precinct where they serve on Election Day. State Board of Elections Director Karen Brinson Bell has requested a change in state law to allow county boards to recruit and train poll workers from across the county. This change would significantly help us staff polling places in these challenging times. Because we must make decisions very soon, we encourage you to include this change in the actions you take when you reconvene next week.

We are committed to administering secure and fair elections, and we would be happy to provide our insights about other changes that may be needed in the future. Our county directors are also valuable resources for conducting safe and secure elections at the county level. The State Board of Elections has provided a number of suggestions that address important issues at the state level, and many of them are also time sensitive, including matching state funds to release federal dollars for enhanced security and COVID-19 related election expenses.

We appreciate your leadership and look forward to working with you.

Sincerely,

Board of Elections Members in Congressional District 11 (alphabetical order of signers)

Pat Ackerman, Cherokee County
Eddie Adams, Cherokee County
Craig Allen, Cherokee County
Jerry Anderson, Clay County
Brian Ball, Madison County
Gary Boone, Yancey County

Sara Champion, Transylvania County
Juanita Colvard, Graham County
Lowell Crisp, Graham County
Gail Criss, Clay County
William Cutler, Henderson County
Pamela Dashiell, Transylvania County
Danny Davis, Haywood County
Gary Dills, Macon County
Billy Ditmore, Graham County
Teresa Eller, Graham County
Lynne Garrison, Macon County
Jeff Gillette, Macon County
Gary Kilpatrick, Cherokee County
Ray Lewis, Madison County
Frances Lockwood, Rutherford County
Pat Margo, Clay County
Charles McCurry, Yancey County
Rusty McLean, Haywood County
Lee McMinn, Transylvania County
Charles Medd, Henderson County
Joey Miller, Yancey County
David Morrow, Transylvania County
Elizabeth Norris, Haywood County
June Ray, Haywood County
Keith Rogers, Graham County
Paul Rohs, Clay County
Dyatt Smathers, Madison County
Linda Smith, Rutherford County
Sandy Solsbee, Cherokee County
Howard Sorrells, Haywood County
Christian Stolz, Henderson County
Kathy Tinsley, Macon County
Julia Tipton, Yancey County
Sandra Tolley, Madison County
John Vanhook, Macon County
Michael Wainwright, Transylvania County
Jerry Wallin, Madison County
Brenda Wilson, Yancey County
Keyla Youngblood-Stillwell, Clay County

EXHIBIT 4

Statement on the second meeting of the International Health Regulations (2005) Emergency Committee Regarding the Outbreak of Novel Coronavirus (2019-nCoV) published by the World Health Organization

Newsroom Detail

Statement on the second meeting of the International Health Regulations (2005) Emergency Committee regarding the outbreak of novel coronavirus (2019-nCoV)

30 January 2020 | Statement | Geneva, Switzerland

The second meeting of the Emergency Committee convened by the WHO Director-General under the International Health Regulations (IHR) (2005) regarding the outbreak of novel coronavirus 2019 in the People's Republic of China, with exportations to other countries, took place on Thursday, 30 January 2020, from 13:30 to 18:35 Geneva time (CEST). The Committee's role is to give advice to the Director-General, who makes the final decision on the determination of a Public Health Emergency of International Concern (PHEIC). The Committee also provides public health advice or suggests formal Temporary Recommendations as appropriate.

Proceedings of the meeting

Members and advisors of the Emergency Committee were convened by teleconference

The Director-General welcomed the Committee and thanked them for their support. He turned the meeting over to the Chair, Professor Didier Houssin.

Professor Houssin also welcomed the Committee and gave the floor to the Secretariat.

A representative of the department of compliance, risk management, and ethics briefed the Committee members on their roles and responsibilities.

Committee members were reminded of their duty of confidentiality and their responsibility to disclose personal, financial, or professional connections that might be seen to constitute a conflict of interest. Each member who was present was surveyed and no conflicts of interest were judged to be relevant to the meeting. There were no changes since the previous meeting.

The Chair then reviewed the agenda for the meeting and introduced the presenters.

Representatives of the Ministry of Health of the People's Republic of China reported on the current situation and the public health measures being taken. There are now 7711 confirmed and 12167 suspected cases throughout the country. Of the confirmed cases, 1370 are severe and 170 people have died. 124 people have recovered and been discharged from hospital.

The WHO Secretariat provided an overview of the situation in other countries. There are now 83 cases in 18 countries. Of these, only 7 had no history of travel in China. There has been human-to-human transmission in 3 countries outside China. One of these cases is severe and there have been no deaths.

At its first meeting, the Committee expressed divergent views on whether this event constitutes a PHEIC or not. At that time, the advice was that the event did not constitute a PHEIC, but the Committee members agreed on the urgency of the situation and suggested that the Committee should continue its meeting on the next day, when it reached the same conclusion.

This second meeting takes place in view of significant increases in numbers of cases and additional countries reporting confirmed cases.

Conclusions and advice

The Committee welcomed the leadership and political commitment of the very highest levels of Chinese government, their commitment to transparency, and the efforts made to investigate and contain the current outbreak. China quickly identified the virus and shared its sequence, so that

other countries could diagnose it quickly and protect themselves, which has resulted in the rapid development of diagnostic tools.

The very strong measures the country has taken include daily contact with WHO and comprehensive multi-sectoral approaches to prevent further spread. It has also taken public health measures in other cities and provinces; is conducting studies on the severity and transmissibility of the virus, and sharing data and biological material. The country has also agreed to work with other countries who need their support. The measures China has taken are good not only for that country but also for the rest of the world.

The Committee acknowledged the leading role of WHO and its partners.

The Committee also acknowledged that there are still many unknowns, cases have now been reported in five WHO regions in one month, and human-to-human transmission has occurred outside Wuhan and outside China.

The Committee believes that it is still possible to interrupt virus spread, provided that countries put in place strong measures to detect disease early, isolate and treat cases, trace contacts, and promote social distancing measures commensurate with the risk. It is important to note that as the situation continues to evolve, so will the strategic goals and measures to prevent and reduce spread of the infection. The Committee agreed that the outbreak now meets the criteria for a Public Health Emergency of International Concern and proposed the following advice to be issued as Temporary Recommendations.

The Committee emphasized that the declaration of a PHEIC should be seen in the spirit of support and appreciation for China, its people, and the actions China has taken on the frontlines of this outbreak, with transparency, and, it is to be hoped, with success. In line with the need for global solidarity, the Committee felt that a global coordinated effort is needed to enhance preparedness in other regions of the world that may need additional support for that.

Advice to WHO

The Committee welcomed a forthcoming WHO multidisciplinary technical mission to China, including national and local experts. The mission should review and support efforts to investigate the animal source of the outbreak, the clinical spectrum of the disease and its severity, the extent of human-to-human transmission in the community and in healthcare facilities, and efforts to control the outbreak. This mission will provide information to the international community to aid in understanding the situation and its impact and enable sharing of experience and successful measures.

The Committee wished to re-emphasize the importance of studying the possible source, to rule out hidden transmission and to inform risk management measures

The Committee also emphasized the need for enhanced surveillance in regions outside Hubei, including pathogen genomic sequencing, to understand whether local cycles of transmission are occurring.

WHO should continue to use its networks of technical experts to assess how best this outbreak can be contained globally.

WHO should provide intensified support for preparation and response, especially in vulnerable countries and regions.

Measures to ensure rapid development and access to potential vaccines, diagnostics, antiviral medicines and other therapeutics for low- and middle-income countries should be developed.

WHO should continue to provide all necessary technical and operational support to respond to this outbreak, including with its extensive networks of partners and collaborating institutions, to implement a comprehensive risk communication strategy, and to allow for the advancement of research and scientific developments in relation to this novel coronavirus.

WHO should continue to explore the advisability of creating an intermediate level of alert between the binary possibilities of PHEIC or no PHEIC, in a way that does not require reopening negotiations on the text of the IHR (2005).

WHO should timely review the situation with transparency and update its evidence-based recommendations.

The Committee does not recommend any travel or trade restriction based on the current information available.

The Director-General declared that the outbreak of 2019-nCoV constitutes a PHEIC and accepted the Committee's advice and issued this advice as Temporary Recommendations under the IHR.

To the People's Republic of China

Continue to:

- Implement a comprehensive risk communication strategy to regularly inform the population on the evolution of the outbreak, the prevention and protection measures for the population, and the response measures taken for its containment.
- Enhance public health measures for containment of the current outbreak.
- Ensure the resilience of the health system and protect the health workforce.
- Enhance surveillance and active case finding across China.
- Collaborate with WHO and partners to conduct investigations to understand the epidemiology and the evolution of this outbreak and measures to contain it.
- Share relevant data on human cases.
- Continue to identify the zoonotic source of the outbreak, and particularly the potential for circulation with WHO as soon as it becomes available.
- Conduct exit screening at international airports and ports, with the aim of early detection of symptomatic travelers for further evaluation and treatment, while minimizing interference with international traffic.

To all countries

It is expected that further international exportation of cases may appear in any country. Thus, all countries should be prepared for containment, including active surveillance, early detection, isolation and case management, contact tracing and prevention of onward spread of 2019-nCoV infection, and to share full data with WHO. [Technical advice is available on the WHO website.](#)

Countries are reminded that they are legally required to share information with WHO under the IHR.

Any detection of 2019-nCoV in an animal (including information about the species, diagnostic tests, and relevant epidemiological information) should be reported to the World Organization for Animal Health (OIE) as an emerging disease.

Countries should place particular emphasis on reducing human infection, prevention of secondary transmission and international spread, and contributing to the international response through multi-sectoral communication and collaboration and active participation in increasing knowledge on the virus and the disease, as well as advancing research.

The Committee does not recommend any travel or trade restriction based on the current information available.

Countries must inform WHO about travel measures taken, as required by the IHR. Countries are cautioned against actions that promote stigma or discrimination, in line with the principles of Article 3 of the IHR.

The Committee asked the Director-General to provide further advice on these matters and, if necessary, to make new case-by-case recommendations, in view of this rapidly evolving situation.

To the global community

As this is a new coronavirus, and it has been previously shown that similar coronaviruses required substantial efforts to enable regular information sharing and research, the global community should continue to demonstrate solidarity and cooperation, in compliance with Article 44 of the IHR (2005), in supporting each other on the identification of the source of this new virus, its full potential for human-to-human transmission, preparedness for potential importation of cases, and research for developing necessary treatment.

Provide support to low- and middle-income countries to enable their response to this event, as well as to facilitate access to diagnostics, potential vaccines and therapeutics.

Under Article 43 of the IHR, States Parties implementing additional health measures that significantly interfere with international traffic (refusal of entry or departure of international travellers, baggage, cargo, containers, conveyances, goods, and the like, or their delay, for more than 24 hours) are obliged to send to WHO the public health rationale and justification within 48 hours of their implementation. WHO will review the justification and may request countries to reconsider their measures. WHO is required to share with other States Parties the information about measures and the justification received.

The Emergency Committee will be reconvened within three months or earlier, at the discretion of the Director-General.

The Director-General thanked the Committee for its work.

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EXHIBIT 5

People who are at higher risk for severe illness,
published by Ctrs. for Disease Control and
Prevention (“CDC”)

COVID-19 is a new disease and there is limited information regarding risk factors for severe disease. Based on currently available information and clinical expertise, **older adults and people of any age who have serious underlying medical conditions** might be at higher risk for severe illness from COVID-19.

Based on what we know now, those at high-risk for severe illness from COVID-19 are:

- [People 65 years and older](#)
- People who live in a nursing home or long-term care facility

People of all ages with [underlying medical conditions, particularly if not well controlled](#), including:

- People with chronic lung disease or moderate to severe asthma
- People who have serious heart conditions
- People who are immunocompromised
 - Many conditions can cause a person to be immunocompromised, including cancer treatment, smoking, bone marrow or organ transplantation, immune deficiencies, poorly controlled HIV or AIDS, and prolonged use of corticosteroids and other immune weakening medications
- People with severe obesity (body mass index [BMI] of 40 or higher)
- People with diabetes
- People with chronic kidney disease undergoing dialysis
- People with liver disease



Older Adults



People with Asthma



At Risk For Severe Illness



People with HIV



People with Liver Disease



People Who Are
Immunocompromised

COVID-19: Are You at Higher Risk for Severe Illness?

Resources

- [ASL Video Series: COVID-19: Are You at Higher Risk for Severe Illness?](#)
- [Learn how you can help protect yourself if you are at higher risk of severe illness from COVID-19](#) 

EXHIBIT 6

Remarks by President Trump, Vice President Pence,
and Members of the Coronavirus Task Force
(Mar. 25, 2020)



REMARKS

Remarks by President Trump, Vice President Pence, and Members of the Coronavirus Task Force in Press Briefing

HEALTHCARE

Issued on: March 25, 2020



James S. Brady Press Briefing Room

5:54 P.M. EDT

THE PRESIDENT: Thank you very much. So, nice to be with you. America continues to gain ground in the war against the virus.

I want to thank the American people for answering the call, following our guidelines, and making the sacrifices required to overcome this terrible threat. More aggressively we commit to social distancing — so important. Social distancing — such an important phrase. And we do it right now. The more lives we can save and the sooner we can eventually get people back to work, back to school, and back to normal.

And there are large sections of our country — probably can go back much sooner than other sections. And we're obviously looking at that also. People are asking, "Is that an alternative?" And I say, "Absolutely, it is an alternative."

I have now approved major disaster declarations for New York, California, Washington, Iowa, Louisiana, Texas, and Florida. That has great significance, as you know, and legal significance.

So, each person in every place — no matter what county, what community, what state — can work with us to ensure that we prevent the spread of this virus to others. So thank you.

THE VICE PRESIDENT: Well done.

Doctor?

DR. FAUCI: Thank you, Mr. Vice President. I just want to spend a couple of minutes telling you a little bit about some information that I got on our weekly call that we have at least once a week with the W- — with WHO, which is led by Dr. Tedros and Mike Ryan, who's the point man there, to give us some information. And, in that regard, I want to apologize for my curt response to you when you asked me about the China deal because I shouldn't have done that. That's not my style.

But what I really wanted to say is that my job is that I'm a scientist, I'm a physician, and I'm a public-health person and I don't like to get involved in that stuff.

So, anyway, getting back to the WHO. So we learned some really interesting information because, obviously, the other countries, like China and others, have — had been hit prior that we did.

One of the things that was striking to me — and I just throw it out because it's something that we will face. We're not facing it now, but we will face — our Chinese colleagues are very concerned because they went through the entire cycle of the curve to come down. And they have very, very few cases. But what they're starting to see as they're relaxing the constraints on travel, that they're getting imported cases. And they wanted to warn us that when we get successful, make sure you very carefully examine how you're going to release the constraints on inputs.

So I know we're going to be successful in putting this under control, but I think we're going to have to remember, we don't want to import cases in. That's the first thing for today.

The second thing that was important is that — it was something that Dr. Birx mentioned. And that is, when you look at the inflection of the curves, we now have multiple different countries that have gone through various phases of their individual outbreaks and you could learn something from them about where you are in your own outbreak.

For example, when China went up, what happened is they just didn't turn around. They went from going to — I'll just take an arbitrary number — 500 new cases a day. The next day, it was 1,000 cases, then 1,500, and then 2,000. But once the number of new cases each day starts to flatten out, that's when you get to that point where the inflection goes down.

So if you — what — things we want to look for are the things that Dr. Birx had mentioned. That doesn't mean you declare victory when it does that, but you know you're at least on the way to where you want to go. And I think that's really very important.

The third and final thing that I think gets back to the question that many of you in the audience have asked of us, is about: Would this possibly become a seasonal cyclic thing? And I've always indicated to you that I think it very well might.

And the reason I say that is that what we're starting to see now in the Southern Hemisphere — in southern Africa and in the Southern-Hemisphere countries — is that we're having cases that are appearing as they go into their winter season. And if, in fact, they have a substantial outbreak, it will be inevitable that we need to be prepared that we'll get a cycle around the second time.

What does that mean for us and what we're doing? It totally emphasizes the need to do what we're doing in developing a vaccine, testing it quickly, and trying to get it ready so that we'll have a vaccine available for that next cycle. In addition, to do the randomized controlled trials of drugs, so that we will have a menu of drugs that we have shown to be effective and shown to be safe. Because I know we'll be successful in putting this down now, but we really need to be prepared for another cycle. And what we're doing, I believe, will prepare us well.

Thank you.

THE VICE PRESIDENT: Thanks, Doctor. We'll take a few questions. Please.

Q Mr. Vice President, on ventilators, some really important reporting from the Center of Public Integrity today. They suggested that there's only 16,000 in the National Stockpile. Can you just give us some clarity: How many ventilators do you have the National Stockpile? Who else is making them? And how long will it take for them to make the critical mass? Because based on the Center for Public Integrity, it appears there aren't enough and people are doing to die as a result.

EXHIBIT 7

*CDC Director Warns Second Wave of Coronavirus
Might be ‘More Difficult’* (Apr. 21, 2020)
published by the Hill



CDC director warns second wave of coronavirus might be 'more difficult'

BY ZACK BUDRYK - 04/21/20 04:51 PM EDT

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OPINION — 11M 39S AGO

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Pope condemns racism, says street violence is 'self-defeating'

INTERNATIONAL — 22M 4S AGO

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CAMPAIGN POLLS — 30M 46S AGO

Stocks continue winning streak amid protests

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00:03 / 00:35

A potential second wave of the novel coronavirus late in the year would likely be more deadly, as it would overlap with flu season, Centers for Disease Control and Prevention (CDC) head Robert Redfield told The Washington Post on Tuesday.

"There's a possibility that the assault of the virus on our nation next winter will actually be even more difficult than the one we just went through," Redfield [told the Post](#). "And when I've said this to others, they kind of put their head back, they don't understand what I mean."

Redfield said two coinciding respiratory outbreaks would strain the nation's health care system even further than the current pandemic, which has been marked by shortages of ventilators, test kits and personal protective equipment.

Americans can make such a scenario less likely, he said, by keeping up to date on flu vaccinations, which he said "may allow there to be a hospital bed available for your mother or grandmother that may get coronavirus."

Governors detail frustrations with Trump over COVID-19 supplies

Overnight Health Care: White House shifts focus from coronavirus |...

Redfield said the U.S. was spared a much worse COVID-19 outbreak because the coronavirus hit the nation when the seasonal flu was already on the decline. Had they hit at the same time, "it could have

VIEW ALL

been really, really, really, really difficult in terms of health capacity,” he said.

The 2009 swine flu pandemic followed a similar trajectory, with an initial wave in spring and then a second in fall and winter, when flu season in the U.S. typically takes place.

The CDC head told the Post that federal and state officials should use the months ahead to scale up their testing capacity for after more widespread restrictions are lifted as well as their ability to find anyone with whom a confirmed case has interacted. Officials must also continue to stress the importance of social distancing even after the restrictions end, Redfield said.

TAGS [THE WASHINGTON POST](#) [ROBERT REDFIELD](#) [CORONAVIRUS](#) [FLU SEASON](#) [PANDEMIC](#)
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EXHIBIT 8

Governor Roy Cooper's Exec. Order No. 141
(May 20, 2020)



State of North Carolina

ROY COOPER
GOVERNOR

May 20, 2020

EXECUTIVE ORDER NO. 141

EASING RESTRICTIONS ON TRAVEL, BUSINESS OPERATIONS, AND MASS GATHERINGS: PHASE 2

WHEREAS, on March 10, 2020, the undersigned issued Executive Order No. 116 which declared a State of Emergency to coordinate the State's response and protective actions to address the Coronavirus Disease 2019 ("COVID-19") public health emergency and provide for the health, safety, and welfare of residents and visitors located in North Carolina; and

WHEREAS, on March 11, 2020, the World Health Organization declared COVID-19 a global pandemic; and

WHEREAS, on March 13, 2020, the President of the United States issued an emergency declaration for all states, tribes, territories, and the District of Columbia, retroactive to March 1, 2020, and the President declared that the COVID-19 pandemic in the United States constitutes a national emergency; and

WHEREAS, on March 25, 2020, the President approved a Major Disaster Declaration, FEMA-4487-DR, for the State of North Carolina; and

WHEREAS, in responding to the COVID-19 pandemic, and for the purpose of protecting the health, safety, and welfare of the people of North Carolina, the undersigned has issued Executive Order Nos. 116-122, 124-125, 129-131, 133-136, and 138-140; and

WHEREAS, more than twenty thousand people in North Carolina have had laboratory-confirmed cases of COVID-19, and hundreds of people in North Carolina have died from the disease; and

WHEREAS, hospital administrators and health care providers have expressed concerns that unless the spread of COVID-19 is limited, existing health care facilities may be insufficient to care for those who become sick; and

WHEREAS, the undersigned and the Secretary of Health and Human Services have directed hospitals, physicians' practices, and other health care entities to undertake significant actions as part of North Carolina's emergency response to address the COVID-19 pandemic; and

WHEREAS, slowing and controlling community spread of COVID-19 is critical to ensuring that the state's healthcare facilities remain able to accommodate those who require medical assistance; and