Received 8/6/2020 9:07:57 PM Commonwealth Court of Pennsylvania

Filed 8/6/2020 9:07:57 PM Commonwealth Court of Pennsylvania
364 MD 2020

NAACP PENNSYLVANIA STATE CONFERENCE, Plaintiffs, v. KATHY BOOCKVAR, SECRETARY OF THE COMMONWEALTH, AND JESSICA MATHIS, DIRECTOR OF THE BUREAU OF ELECTION SERVICES AND NOTARIES, Defendants,	)	**AFFIDAVIT OF DR. DAVID J. WEBER**

I, Dr. David J. Weber, do herby under oath say the following:

1. I am of legal age and competent provide this affidavit. All the information herein is based on my own personal knowledge unless otherwise indicated.

2. My background, qualifications, and professional affiliations are set forth in my curriculum vitae, which is attached as Exhibit A.

3. In the context of this affidavit, I use several acronyms, as follows: US Centers for Disease Control and Prevention (CDC); Society for Healthcare Epidemiology of America (SHEA); University of North Carolina at Chapel Hill (UNC); World Health Organization (WHO). A list of specific references for the information included in this affidavit is attached as Exhibit B.

SUMMARY OF CONCLUSIONS

4. In my expert opinion and based on my expertise in assessing the impact of COVID-19 on public health, the risk of transmitting COVID imposed by voting in person at polling places where the use of electronic ballot-marking devices is required is far greater than the risk imposed by voting at places where most voters are casting hand-marked paper ballots.

5. I reach this conclusion for several reasons. First, many voters and poll workers are repeatedly touching the electronic voting machines. Even with vigorous disinfection, the electronic voting machines will have more microbes than individual paper ballots, which are particular to each voter. Second, someone has to prepare the electronic voting machine to

program the ballot for each voter. This interaction requires lengthier and closer interactions between the voter and the poll worker than exchanging paper ballots. COVID-19 is a distance-related disease; the longer time and closer the distance to an infected individual, the higher the risk of transmission. Third, the repeated cleaning before and after each voter, as well as the time necessary to program the ballot, will lead to each voter waiting a longer period of time before he or she can begin filling out her ballot. Because COVID-19 is an aerosol spread disease, the longer the voter is in the polling place, the greater the risk of infection.

6. The measures described in the Pennsylvania Department of State's April 28, 2020 "Election Operations During COVID-19" memorandum do not adequately reduce the risk of substantial transmission of COVID-19 when voting in person at a polling place. The Department of State's memorandum suggests that polling places should "consider" measures such as providing election officials with gloves, masks, and other personal protective equipment, and placing hand sanitizer stations at the polling place entrance and exit. The memorandum's "polling place setup" section provides two measures that county boards of elections "may consider" for preventing the spread of germs on voter privacy sleeves for voters using paper ballots, but does not even mention procedures for disinfecting electronic voting machines. Even if poll workers have hand wipes or have disinfectant spray on hand, people may not use it, and officials may not always follow with an environmental disinfectant.

7. The consensus of public health experts is that there will be a second wave of COVID-19 in Fall 2020, if not sooner. COVID-19 is not over and the situation is going to get worse from a public health perspective.

8. Pennsylvania election officials and poll workers have no public health expertise and their opinions about what they propose undertaking for future elections are not consistent with basic and accepted principles of public health. Yet, failing to take appropriate measures at polling places affects the health of voters, poll workers and election officials, and the entire community.

QUALIFICATIONS & MATERIALS REVIEWED

9. I am a physician, having received my medical degree from the University of California, San Diego, in 1977. I am licensed to practice in North Carolina. I am currently a Professor of Medicine and Pediatrics in the UNC School of Medicine. I have been a faculty member of these Departments since 1985.

10. I received my Master's in Public Health from Harvard University in 1985. I am a Professor in the Department of Epidemiology, University of North Carolina Gillings School of Global Public Health. I have been a faculty member of the Department of Epidemiology since 1985.

11. I have served as the Medical Director of the Department of Hospital Epidemiology (Infection Prevention), UNC Hospitals since 1985. Our Department consists of ~20 persons including multiple infection prevention nurses, a laboratory technologist, a public health epidemiologist, 2 quality improvement experts, 1 auditor, and 1 PhD epidemiologist/environmental scientist.

12. I have published approximately 440 scientific papers cited in PubMed, the great majority of which are in the field of healthcare-associated infections.

13. I am an Associate Editor of Infection Control Hospital Epidemiology, the official journal of the Society for Healthcare Epidemiology of America.

14. I am a Fellow of SHEA. I have served on many committees of SHEA including the SHEA Board, Awards Committee (chair), Publications Committee, Annual Planning Committee, and Guidelines Committee. I am currently the Secretary of the SHEA Board.

15. I am a fellow of IDSA. I have served on many committee of IDSA including the Annual Planning Committee and Guidelines Committee.

16. I have served on multiple working groups of the Advisory Committee on Immunization Practices (ACIP), Centers for Disease Control and Prevention (CDC) in the recent past.

17. I have authored multiple guidelines for the Centers for Disease Control and Prevention and the Society of Healthcare Epidemiologists of America on the following subjects: Sterilization and Disinfection, 2008 (CDC); Influenza Vaccine for Healthcare Personnel (SHEA); Management of the HIV, HBV, or HCV Infected Healthcare Provider (SHEA); Sterilization and Disinfection of Prion Contaminated Medical Instruments (SHEA); Infection Control Guidelines for Persons with Cystic Fibrosis (CF Foundation), Prevention of *Clostridium difficile* Infections (SHEA), Management of Animals in Hospitals (SHEA); and Visitors in the Hospital (SHEA). Pending co-authored guidelines include: a revision of the Management of the HIV, HBV, or HCV Infected Healthcare Provider (SHEA), and revision of the Guideline on Sterilization and Disinfection (co-lead).

18. I was a visiting scientist at the National Institutes of Health (NIH) in 1992-1993 (HIV Epidemiology and Vaccine Branch, National Institute of Allergy and Infectious Diseases). I have served as a guest lecturer in the field of epidemiology and/or infectious diseases in the past 5 years for the Governments of Saudi Arabia, Germany, and Hong Kong.

19. I serve as the Chair of the North Carolina Department of Health's Tuberculosis Advisory Committee.

20. I have twice received the annual publication award of the American Journal of Infection Control for the most cited paper in the journal during the calendar year.

21. I received the 2018 Senior Scholar Award from SHEA. I am the 2014 recipient of the Greenberg Award, UNC Gillings School of Global Public Health.

22. I have authored multiple papers on coronaviruses, including SARS-CoV-2.

23. I am deeply involved on COVID-19 preparedness and mitigation for the UNC Medical Center and UNC Health. I serve as an advisor on COVID-19 preparedness and mitigation to the Chancellor of UNC-CH and the President of the UNC College/University system.

24. I am an advisor to the WHO and served on the working group that developed the WHO's Guidance on Cleaning and Disinfection of Surfaces during the COVID-19 pandemic. I serve as an advisor on COVID-19 preparedness and mitigation to the Lt General commanding the XVIII Airborne Corps at Fort Bragg (~90,000 soldiers under this command)

25. I Chair the UNC Institutional Review Board's Special COVID-19 Review Committee.

BACKGROUND INFORMATION CONCERNING TRANSMISSION OF COVID-19

26. Coronaviruses are single-stranded, linear, positive-sense RNA, enveloped viruses. Four endemic coronaviruses cause respiratory tract infections in humans: 229E, HKU1, NL63 and OC43. Three epidemic coronaviruses have been described; SARS-CoV-1, MERS-CoV, and SARS-Cov-2. All of these coronaviruses likely originated in bats (Menacherv VD, Chen Y, Lee P-I). While intermediate hosts have been noted for SARS-CoV-1 (i.e., palm civet) and

MERS-CoV (i.e., dromedary camels), an intermediate host has not been described for SARS-CoV-2.

27. Transmission of SARS-CoV-2 has been well described by the WHO, the CDC, and medical experts (Weber DJ). The major mode of SARS-CoV -2 transmission is by respiratory droplets expelled by infectious persons. The WHO has stated the "Transmission of SARS-CoV-2 can occur through direct, indirect, or close contact with infected people through infected secretions such as saliva and respiratory secretions or their respiratory droplets, which are expelled when an infected person coughs, sneezes, talks or sings." WHO noted that "respiratory droplet transmission occurs when a person is in close contact (within 1 meter) with an infected person who has respiratory symptoms (e.g., coughing or sneezing) or who is talking or singing; in these circumstances, respiratory droplets that include virus can reach the mouth, nose or eye of a susceptible person and can result in infection."

28. The CDC has stated, "COVID-19 is thought to spread mainly through close contact from person-to-person. Some people without symptoms may be able to spread the virus." CDC has listed the main mode of persons-to-person spread of COVID-19 at follows (CDC): 1) Between people who are in close contact with one another (within about 6 feet); the more closely a person interacts with others and the longer that interaction, the higher the risk of COVID-19 spread; 2) Through respiratory droplets produced when an infected person coughs, sneezes, or talks; 3) These droplets can land in the mouths or noses of people who are nearby or possibly be inhaled into the lungs; and, 4) COVID-19 may be spread by people who are not showing symptoms.

TRANSMISSION VIA ASYMPTOMATIC OR PRE-SYMPTOMATIC PERSONS

29. Per the WHO, SARS-CoV-2 transmission appears mainly to be spread via droplets and close contact with infected symptomatic cases (WHO). However, transmission may occur from asymptomatic persons. As noted by the WHO, to better understand the role of transmission from infected people without symptoms, it is important to distinguish between transmission from people who are infected who never develop symptoms (asymptomatic transmission) and transmission from people who are infected but have not developed symptoms yet (pre-symptomatic transmission). The WHO had noted that patients infected with SARS-CoV-2 may be asymptomatic, but that the proportion of people whose infection is asymptomatic likely varies with age due to the increasing prevalence of underlying conditions in older age groups (and thus increasing risk of developing severe disease with increasing age), and studies that show that children are less likely to show clinical symptoms compared to adults (WHO). A recent systematic review estimated that the proportion of truly asymptomatic cases ranges from 6% to 41%, with a pooled estimate of 16% (12%–20%) (Byambasuren O).

30. Per WHO, multiple studies have shown that people infect others before they themselves became ill, which is supported by available viral shedding data (i.e., people may shed viable virus for at least 48 hours before they develop symptoms). One modelling study, that inferred the date of transmission based on the estimated serial interval and incubation period,

estimated that up to 44% (25-69%) of transmission might have occurred just before symptoms appeared (He X).

31. Pre-symptomatic transmission of SARS-CoV-2 accounted for 6.4% of locally acquired cases in Singapore from 23 January to 16 March, 2020 (Wei W). Asymptomatic and pre-symptomatic transmission was demonstrated to play an important role in an outbreak in long-term care skilled nursing facility in King County, Washington (Kimball A).

32. Outbreaks of COVID-19 have been reported in indoor crowded spaces including restaurants (Lu J), fitness classes (Jang S), and during choir practice (Hamner L). Attending events at a Church led to a high COVID-19 attack rate (James A). Family gatherings such as attending a funeral or a birthday party have led to COVID-19 clusters (Ghinai I). These outbreaks demonstrate the infectiousness of SARS-CoV-2 and the possibility for transmission at both outside events and indoor congregate activities, such as a polling place where voting is occurring during an election.

SURVIVAL IN AIR AND ON SURFACES

33. Coronaviruses including SARS-CoV-2 may survive on environmental surfaces such as the screen of an electronic voting machine for hours to days (Weber DJ, Kampf G). Importantly, SARS-CoV-2 may survive on paper for at least several hours. Per WHO, experimental studies have generated aerosols of infectious samples using high-powered jet nebulizers under controlled laboratory conditions. These studies found SARS-CoV-2 virus RNA in air samples within aerosols for up to 3 hours in one study (van Doremalen) and 16 hours in another, which also found viable replication-competent virus (Fears AC).

IMPACT OF COVID-19 INFECTIONS

34. As of 12 July 2020, a total of 12,776,232 cases of COVID-19 has been reported worldwide which resulted in 566,036 deaths (Johns Hopkins). In addition to hospitalizations and death, a majority of patients who had had symptomatic COVID-19 suffered from persistent symptoms that may last for months (Carfi A). These include fatigue, shortness of breath, joint pain, and chest pain.

35. As of 12 July 2020, a total of 3,271,549 cases of COVID-19 has been reported in the US, which resulted in 134,904 deaths (Johns Hopkins). The US leads the world in both number of COVID-19 cases and deaths. In fact, more than 25% of the total cases reported worldwide have occurred in the US and more than 23% of the total number of deaths reported worldwide have occurred in the US.

36. COVID-19 cases in the US rapidly increased between 1 March and 1 April 2020 (Johns Hopkins). The incidence of new cases decreased somewhat between 1 April and mid-June 2020 but remained a high level. Between 1 June and mid-July there has been a dramatic increase in the incidence of COVID-19 in US; there are now more than 50,000 new cases per day. It is likely that the US will continue to have a substantial number of new cases of

COVID-19 for months to come as the CDC has estimated that less than 10% of the US population has acquired COVID-19.

37. As of 27 July 2020, the Pennsylvania Department of Health has reported 105,228 cases and 7,122 deaths (PADH). Importantly, every county in Pennsylvania has reported cases of COVID-19.

38. As of 27 July, Pennsylvania continues to have a substantial of new COVID-19 cases each day (PADH).

DISADVANTANGED GROUPS

39. The CDC states, "Long-standing systemic health and social inequities have put some members of racial and ethnic minority groups at increased risk of getting COVID-19 or experiencing severe illness, regardless of age. Among some racial and ethnic minority groups, including non-Hispanic black persons, Hispanics and Latinos, and American Indians/Alaska Natives, evidence points to higher rates of hospitalization or death from COVID-19 than among non-Hispanic white persons."

40. As of June 12, 2020, age-adjusted hospitalization rates are highest among non-Hispanic American Indian or Alaska Native and non-Hispanic black persons, followed by Hispanic or Latino persons" (CDC-COVID in Racial/Ethnic Minority Groups). CDC noted that that "non-Hispanic black persons have a rate approximately 5 times that of non-Hispanic white persons" and "Hispanic or Latino persons have a rate approximately 4 times that of non-Hispanic white persons" (CDC-COVID in Racial/Ethnic Minority Groups).

41. An analysis of 1,320,488 laboratory-confirmed COVID-19 cases individually reported to CDC during January 22–May 30, 2020, revealed that among cases with known race and ethnicity, 33% of persons were Hispanic, 22% were black, and 1.3% were Asian (Stokes EK). Per CDC, these findings suggest that persons in these groups, who account for 18%, 13%, and 0.7% of the U.S. population, respectively, are disproportionately affected by the COVID-19 pandemic (Stokes EK).

42. A study of race/ethnicity of adult patients with COVID-treated at an urban safety/net hospital revealed that hospitalized patients were likely to be Hispanic or to be experiencing homelessness; overall the cohort comprised 44.6% non-Hispanic black patients and 30.1% Hispanic or Latino (Hispanic patients) (Hsu HE).

43. Not only do Hispanic and Black individuals have a higher risk of acquiring COVID-19, but they also have a higher risk of hospitalization if infected. A study in Atlanta Georgia that used multivariable analysis reported the following characteristics were independently associated with hospitalization: age ≥65 years (adjusted odds ratio [aOR] = 3.4), *black race (aOR = 3.2)*, having diabetes mellitus (aOR = 3.1), lack of insurance (aOR = 2.8), male sex (aOR = 2.4), smoking (aOR = 2.3), and obesity (aOR = 1.9) (Killerb ME).

44. The Department of State's memorandum does not indicate that officials are making special accommodations for older and medically-vulnerable populations. These individuals are at the greatest risk of suffering severe complications from COVID-19. In addition, they are more likely to experience more symptoms, such as coughing and running nose. These symptoms contribute to excess viral shedding, which contributes to greater contagion in a congregate setting like a polling place.

MITIGATION OF COVID-19: RECOMMENDATIONS TO PREVENT TRANSMISSION

45. Per the Pennsylvania Department of Health COVID-19 response webpage, the following actions should be undertaken by people: wearing a mask in public, washing your hands, avoiding touching your face, and cleaning surfaces. (PADH)

46. The CDC has the following recommendations for the public to avoid COVID-19 infections: 1) Avoid close contact outside your home; put 6 feet of distance between yourself and people who don't live in your household; 2) Cover your mouth and nose with a cloth face cover when around others; everyone should wear a cloth face cover in public settings and when around people who don't live in your household, especially when other social distancing measures are difficult to maintain; 3) Wash your hands often with soap and water for at least 20 seconds especially after you have been in a public place, or after blowing your nose, coughing, or sneezing; and, 4) Clean AND disinfect frequently touched surfaces daily (e.g., tables, doorknobs, light switches, countertops, handles, desks, phones, keyboards, toilets, faucets, and sinks) (CDC).

47. To prevent transmission, WHO recommends a comprehensive set of measures that include the following statement: "At all times, practice frequent hand hygiene, physical distancing from others when possible, and respiratory etiquette; avoid crowded places, close-contact settings and confined and enclosed spaces with poor ventilation; wear fabric masks when in closed, overcrowded spaces to protect others; and ensure good environmental ventilation in all closed settings and appropriate environmental cleaning and disinfection" (WHO).

48. SARS-CoV-2 is inactivated by waterless ethanol based handrubs (60-90% alcohol) and can be removed from the hands by soap and water washing. EPA surface disinfectants with an emerging virus claim may be used to disinfect contaminated surfaces. UV devices and hydrogen peroxide systems may also be used for surface disinfection but since persons cannot be exposed to the UV rays or the hydrogen peroxide they are useful only for disinfection at the end of the day when persons are not in the room. Importantly, there is no scientific evidence to suggest that use of plexiglass partitions (unless they completely enclose a space) are protective. Similarly other barrier methods such as partitions or curtains have not been demonstrated to prevent COVID-19 transmission.

49. As noted above, any congregate facility/activity placed persons at risk of acquiring SARS-CoV-2. Attendants at a voting location likely will NOT be able to practice physical distancing (i.e., remaining >6 feet apart) since in person voting requires waiting in line, checking in, verification of name and place of residence, and use of a voting machine or paper ballot. Further, it is highly unlikely that 100% of persons attending a voting location will be appropriately wearing a mask.

50. Use of a voting machine requires a person to touch a screen or a button. Any hand contact with a surface may lead to acquisition of COVID-19 if the previous person was infected (even if asymptomatic) unless the entire touchable surface was appropriately disinfected. Thus, use of any touchable surface requires per CDC guidance appropriate disinfection plus appropriate hand hygiene between each use. Paper ballots likely present a lower risk than a voting machine because SARS-CoV-2 survives for a shorter length of time on paper than on plastic, metal, or other solid surfaces, and because paper ballets are not touched by multiple persons. However, any election staff handling such ballots must either perform hand hygiene prior to touching the ballot or wear gloves.

VENDORS' CLEANING PROCESSES ARE LENGTHY AND CREATE RISK

51. ES&S, Dominion Voting, and Unisyn, which manufacture voting machines which all voters in certain Pennsylvania counties are expected to use, have each published guidelines for cleaning their respective equipment, which I have reviewed. The devices these companies manufacture have a number of surfaces that will require cleaning, including touch screens, ADA peripherals, input trays, ballot boxes, and external surfaces of the equipment.

52. Many common cleaners cannot be used on the voting machines. For instance, in its guidance, ES&S warned against using "full-strength, harsh detergents, liquid cleaners, aerosols, abrasive pads, scouring powders, or solvents."

53. According to ES&S's instructions, to disinfect its voting machines, a trained poll worker must have access to a "soft, lint-free cloth with isopropyl alcohol (70%)," an "ES&S Touch Screen Cleaning Kit," or alcohol wipes.

54. ES&S's instructions contain warnings that limit how workers may disinfect the machines, including warnings to not scratch the screen, not to use common disinfectant sprays, not to apply liquid cleaner to the unit, not to "soak the cloth with solution," and not to touch the sensor tracks along the edges of the screen because "[e]xposing the sensors to disinfectants could damage the entire touch screen." ES&S's instructions also specify that, for each external surface of the device, "[t]o disinfect, maintain contact with the surface for a sustained duration; between 30 seconds and 10 minutes depending on the product."

55. Similarly, Dominion Voting warns that some CDC-recommended products "may not be appropriate for your hardware and may cause problems." Dominion further warns that the cleaning instructions must be followed precisely "to prevent damage to your voting system

touchscreens and tabulators," and that "[c]leaning the units while they are powered ON is not recommended."

56. Finally, Unisyn Voting Solutions suggests cleaning the voting machines' disparate parts in different ways. Equipment cases should be cleaned with a "slightly damp cloth and mild detergent," but the mild detergent should not be used "on any of the exposed areas of the printer." Touchscreens should be cleaned with different solutions because certain solutions "may permanently damage the touchscreen."

57. Disinfecting the voting machines correctly will take a substantial amount of time (e.g., between 30 seconds and 10 minutes per surface), and it is not a simple endeavor to properly clean all of the machines' components.

58. If the poll worker uses the wrong disinfectant, accidentally touches a button during disinfection, or does not disinfect the machine according to the vendor's instructions, the machine could break or malfunction.

59. If the machine is not cleaned after each person casts a ballot, the coronavirus-and other viruses and bacteria-will remain on the touch screen, keypad, and other surfaces.

60. If poll workers disinfect each machine after every voter uses it, particularly at the necessary level of care recommended by the vendors, that risks causing voters to have to wait at polling places before beginning to complete their ballot, particularly where those machines are mandatory and being used in high turnout elections. Longer wait times, in turn, voters having to stand near poll workers or in clusters inside the polling place, thereby increasing the risk of airborne transmission of COVID-19.

CONCLUSIONS AND RISK TO PERSONS VOTING INPERSON AT A POLLING LOCATION

61. COVID-19 is caused by a novel coronavirus, SARS-CoV-2

62. COVID-19 as of 12 July 2020 has resulted in 12,776,232 cases worldwide and 3,271,549 cases in the US. COVID-19 has resulted in 566,036 deaths worldwide and 134,904 deaths in the US.

63. As of 27 July 2020, Pennsylvania has reported 108,264 cases and 7,122 deaths.

64. SARS-CoV-2 is mainly transmitted by expelled droplets from infected persons that may travel for up to 6 feet and by direct contact. Indirect transmission via contaminated fomites and environmental surfaces such as the screen of an electronic voting machine is likely.

65. Importantly, SARS-CoV-2 may be transmitted by persons who are infectious but are asymptomatic or pre-symptomatic.

66. Masks worn by infected persons and by non-infected persons reduce the risk of transmitting or acquiring SARS-CoV-2.

67. Outbreak investigations have demonstrated that COVID-19 infections may result when groups of people have close contact without practicing universal masks and physical distancing.

68. SARS-CoV-2 is a serious disease that has led to millions of American being infected and has resulted in greater than 149,000 American deaths.

69. Based on scientific studies of SARS-CoV-2 transmission, evaluation of COVID-19 outbreaks, and CDC and WHO guidelines, the presence of multiple people at a polling location places such people at high risk for acquiring COVID-19. As a consequence of acquiring COVID-19 such persons are at high risk for hospitalization, death, and if they survive, long-term health problems.

70. The risk of transmitting COVID-19 by touching electronic voting devices is higher than by voting using hand-marked paper ballots. Other coronaviruses have been found to survive for 4 to 5 days on glass surfaces and up to 5 days on plastic (with certain strains surviving for up to 9 days).

71. Every voter will have to touch the electronic voting device screen or keypad a number of times to vote and touch the plastic components when inserting and retrieving the ballot card.

72. In some counties, poll workers must touch the screen of the voting device to activate the machine and pull up the ballot style for each voter. This creates additional vectors of transmission, as it increases the chance of person-to-person transmission between the poll worker and voter while they are in close proximity, and increases the risk that the poll worker will transfer the virus onto the screen while setting the machine up for the voter. To avoid the second type of transmission, the poll worker should disinfect the screen a second time, after activating the machine and pulling up the ballot style-but this will lengthen the time that the poll workers is in close proximity with the voter, and risk the poll worker inadvertently making selections on the voter's behalf.

73. Voters casting ballots in polling places where use of an electronic voting machine is required will be at greater risk for contracting the novel coronavirus than voters who are allowed to vote using hand-marked paper ballots in counties that reserve ballot marking devices (BMDs) for individuals who require assistive technology.

74. Poll workers also risk contracting COVID-19 or inadvertently transmitting it to voters due to the number of times they must touch the machine on Election Day.

75. Voting booths and pens do not pose the same threat of transmission as does touching an electronic voting machine. Paper ballots do not have to be handled by anyone except the poll worker and the voter.

The foregoing is true and accurate to the best of my knowledge under penalty of perjury.

Executed 31/ July, 2020, at Chapel Hill, North Carolina.

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