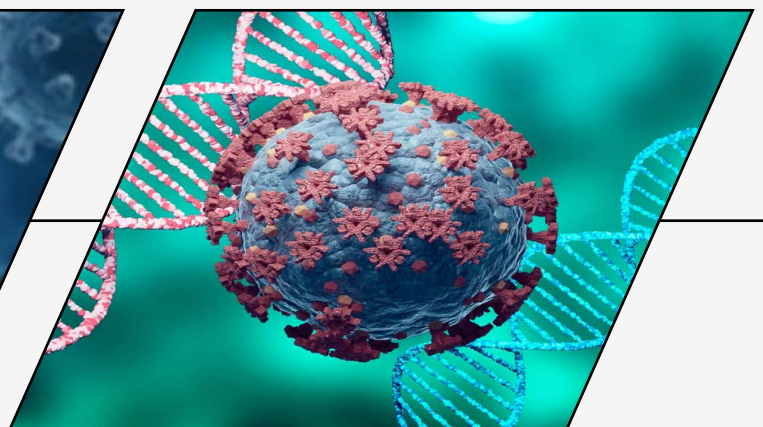
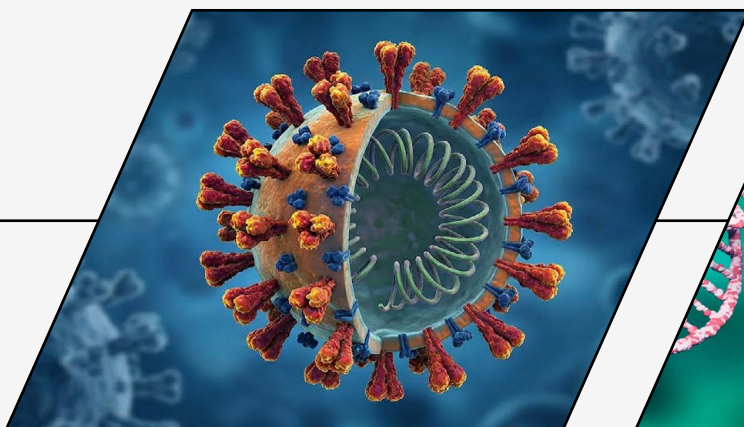


# Understanding COVID-19

*Insights on Science, Policy, and Perception*

Colin A. Ross



*Dr. Colin A. Ross*

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## Contents

| S. No | Title                                                                                       | Page No |
|-------|---------------------------------------------------------------------------------------------|---------|
| 1     | <i>Thoughts on COVID-19</i>                                                                 | 1       |
| 2     | <i>Facemasks are Not Effective for Preventing Transmission of the Coronavirus</i>           | 6       |
| 3     | <i>How Misinformation that Facemasks are Effective for Reducing COVID-19 is Transmitted</i> | 9       |
| 4     | <i>Commentary: Suggested Questions for Reporters Concerning COVID-19</i>                    | 13      |
| 5     | <i>Differences in Evaluation of Hydroxychloroquine and Face Masks for SARS-CoV-2</i>        | 16      |
| 6     | <i>mRNA Vaccines for SARS-CoV-2 are “95% Effective”: What Does That Mean?</i>               | 20      |
| 7     | <i>Misinformation Concerning Face Masks and the Wuhan Lab Leak</i>                          | 22      |
| 8     | <i>COVID Face Masks and the Wuhan Lab Escape Theory: An Update</i>                          | 26      |
| 9     | <i>Thoughts On the Politics of COVID-19</i>                                                 | 30      |
| 10    | <i>How the Medical Profession Contributes to COVID-19 Vaccine Hesitancy</i>                 | 35      |

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# Thoughts on COVID-19

## Introduction

Despite calls by leading medical authorities and organizations to base policy on science and to trust the experts, statements made by physicians, academic epidemiologists, computer modelers, and the CDC and WHO have been inconsistent and confusing during the coronavirus pandemic. What follows are some thoughts and impressions about the pandemic based on what I have seen in the media. I am commenting only on professionals, and my focus is on the United States.

## Death Rates

Much of the time the death rates stated by individual physicians and health care organizations have been much higher than reality because they are stated as deaths per positive coronavirus test. This has resulted in estimated death rates as high as 13%. These high death rates are an artifact of the number of individuals tested. The death rates should be calculated based on the test-confirmed COVID-19 deaths in the population as a whole. If we assume that 20% of the population has contracted the coronavirus and there are 330,000,000 million people in the United States, this would mean that there are 66,000,000 people who have contracted the coronavirus. If there have been 115,000 COVID-19 deaths, this results in a death rate of 0.17% per infected person, which is almost the same as the death rate for the flu provided by the CDC. If we assume that only 5% of people in the United States have contracted the coronavirus, then the death rate is 0.7% per infected person. This seems to be the realistic range for the death rate for coronavirus infection based on information available to date – 0.1% to 0.7%. As the number of infected individuals and deaths increases, the death rate may fluctuate a little but should remain in this range. No matter what percentage of the population has been infected to date, the death rate in the entire population so far is  $115,000/330,000,000 = 0.03\%$  or 3 in 10,000.

## Computer Models

Computer models of the pandemic have been generated by leading epidemiologists at major universities. Early in the pandemic some of these models were predicting 2,000,000 COVID-19 deaths in the United States. In late April, 2020 one model predicted 200,000 deaths in the United States in June alone if lockdown was lifted. If we assume that there will be 200,000 COVID-19 deaths in the United States during the first wave in 2020, then these estimates are 10 times the actual numbers.

## The Importance of Testing

Experts have stated that insufficient testing is a bad thing because we don't know the actual number of infected individuals in the country as a whole or in different regions and cities. This is an epidemiological problem that could be solved with basic sampling procedures requiring a finite and affordable number of tests. We have random sampling of the general population all the time conducted by a variety of organizations. This is a basic failure of medical and public health organizations. It does not instill confidence in medical authorities. Concerns about upward trends in cases post-lockdown rarely take into account the increased amount of testing, and rarely explain to the public that the increase in cases could be at least in part an artifact of increased testing.

## Comparison to The Flu

For both the flu and COVID-19 there are serious and basic problems with how deaths are counted. For both, cases can be counted as virally caused deaths without any testing having been done, or if someone dies from other causes but happens to be coronavirus-positive at the time. This further increases the uncertainty about what is going on, and undermines confidence in authorities and experts.

## Facemasks

In a period of a few months we went from the Surgeon General stating adamantly that facemasks need not be worn by the general public to mandatory facemasks in some states and counties, with no intervening new science. These polar opposite recommendations were backed by federal government health agencies and medical organizations, with no intervening new science. As of June, 2020, the CDC was recommending that asymptomatic people wear masks in public and the WHO was recommending against that.

It is agreed that the coronavirus is about 0.1 micron in size. It is hard to find the pore size of regular surgical masks online but the numbers vary from 50 microns to 500 microns. It is clear that surgical masks will provide no barrier to individual viruses. The same is true for viruses in aerosols. The only possible protection conferred by facemasks is for viruses contained in larger droplets. Why then are medical authorities recommending or even mandating facemasks? The most common rationale is to protect the public from transmission by asymptomatic carriers who might sneeze or cough in public. However, a person with coronavirus in his or her system who is coughing or sneezing is not an asymptomatic carrier. In any case, how often do asymptomatic people cough or sneeze in public, with or without a pandemic? It is widely stated by medical authorities that facemasks do not protect an individual from others: the purpose is to protect others from infection by asymptomatic carriers. For instance, the CDC states that, “The cloth face cover is meant to protect other people in case you are infected” (<https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/prevention.html>).

This makes no sense, and is illogical and self-contradictory. If wearing a facemask won't protect me from you, how is it supposed to protect you from me? If persons A and B are both infectious asymptomatic carriers and both are wearing facemasks, the CDC is saying that person A (you) will not be protected but person B will be protected from you. This is a weak motivational message because it hinges on altruism rather than self-protection and it is illogical and unscientific. Mandating facemasks to reduce coronavirus transmission by asymptomatic carriers in public is unlikely to be effective and it could at most have a small effect. For example, in a recent study of coronavirus infection rates in fifteen states and D.C. for 21 days after mandating of public facemasks the infection rate declined by 0.9%-2.0% in each five-day increment compared to the five days before the mandate [1]. The time period sampled was March 31 to May 22, 2020, during which time the curve was flattening in most of the country. If we assume that the overall infection rate in the general population was 5% then the decline was a maximum of  $(.05 \times .02 = .001)$  0.1% of the population as a whole, and only a portion of that reduction could be attributed to facemasks since many other uncontrolled variables were operating at the same time. There is no stronger evidence concerning the effectiveness of facemasks in the real world. Arguments that masks do no harm do not take into account the burden of hundreds of millions of masks per day on landfills and the environment.

## Hydroxychloroquine

Hydroxychloroquine has oscillated from being a major tool against the coronavirus to being a medication that is contraindicated outside research settings within a few months. The contraindication is due to a combination of lack of efficacy and cardiac side effects and risk of death. Both poles of this oscillation have been endorsed by medical authorities and medical and public health institutions in the absence of adequate controlled trials.

## Remdesivir

Like hydroxychloroquine, remdesivir has been hailed as a major tool against the coronavirus, in the absence of definitive controlled data. Preliminary data indicate that the drug reduces time in hospital from an average of 15 days to 11 days. There are no data showing an effect on mortality or on long-term morbidity. The cost of this drug has been significantly reduced to about \$3000.00 for a 5-day course in the US, but it cannot be used at all in populations without access to modern hospitals and IV equipment. The point is not that remdesivir is useless or should be abandoned – the point is that it has been over-endorsed by US medical authorities and experts.

## Respirators

A recent study tabulated 5700 COVID-19 patients admitted to hospitals in New York [2]. The paper reported that 97.2% of COVID-19 patients over 65 years of age placed on respirators in New York died. The point is not that respirators are useless, but that their importance and effectiveness have been over-endorsed by medical authorities and organizations. The most effective tools, so far, appear to have been basic public health measures like social distancing and self-quarantines. To do a truly scientific analysis of the clinical cost-benefit of respirators for COVID-19 patients, we will need follow-up data on morbidity caused by the respirators, which seems to be severe in some cases.

## Sweden

Sweden has been denigrated by US medical authorities for having exposed its citizens to an increased risk of illness and death by not imposing a lockdown. What are the data? If we round off the current numbers, Sweden has a population of 10,000,000 and has had 3,000 COVID-19 deaths. This is a death rate of 0.0003. The United States has a population of 330,000,000 and has had 115,000

COVID-19 deaths. This is a death rate of 0.0003. The data actually show that lockdown has no effect on the death rate. As recently as mid-June, Sweden was denigrated for its high number of cases due to insufficient lockdown but its death rate from COVID-19 was 0.03% of the population compared to 0.01% in Germany, 0.02% in the United States and 0.05% in Italy. Sweden is the closest thing we have to a control group, imperfect as it is. Yet, US medical authorities will conclude with certainty, in the absence of any rigorous control group, that lockdown saved many lives. In social psychology this is called an attribution error.

## Vaccinations and Herd Immunity

My children and I are all fully vaccinated against childhood infectious diseases. I remember the polio epidemic. The smallpox vaccine has been a major public health success. I am not an anti-vaxxer to the slightest degree. But our medical authorities are placing too much hope and emphasis on the development of a coronavirus vaccine. It is worth trying, but so far no effective vaccine has been developed against any coronavirus and flu vaccines vary in effectiveness for a given flu season's primary strain from 9% to 60% according to the CDC, with an average of 40% over decades. The odds that we are going to solve the COVID-19 threat through vaccines are low. One of the main arguments in favor of developing a coronavirus vaccine is to generate herd immunity. This has worked for measles, for which there is a herd immunity above 95% in the United States due to vaccines. According to the CDC, we have tens of thousands of flu deaths in the United States per year even though we have had flu vaccines for years. The flu vaccine provides immunity at a rate far below the threshold for meaningful herd immunity, which is usually said to be about 70%. The evidence to date suggests that a coronavirus vaccine will not confer useful herd immunity. The herd immunity argument in favor of a coronavirus vaccine is not logical or based on science. It is a false hope.

One of the arguments mounted in favor of a coronavirus vaccine by medical authorities and institutions has been that the virus itself may not confer immunity on everyone infected, and if it does the immunity may not last. The argument is that vaccines are required both to protect individuals and to generate herd immunity. This is illogical. If the virus does not confer adequate long-lasting immunity, why would we expect the vaccine to do so? We already know that the CDC recommendation is to get a flu vaccine annually because it does not confer long-lasting immunity. The herd immunity argument is another example of statements made by medical authorities that are not based on logic and science. All of these concerns about the effectiveness of a coronavirus vaccine are compounded by recent reports that the virus has already mutated, and the mutated variant is now the primary strain.

## Discussion

The purpose of this commentary is to describe the conflicting, inaccurate and unscientific statements made by medical authorities and medical and public health organizations. These statements cannot be defended by saying that the pandemic situation is fluid – which it is – because the statements are inconsistent with each other, with basic logic and with the available science. Authorities have been contributing to public confusion by making contradictory and unscientific statements about the coronavirus, COVID-19, epidemiology, and the risk-benefit of various actions and inactions while advocating that policy be based on science and data. This cannot help the public or policy makers, and is likely to undermine the public's faith in science and medicine. An over-arching problem is that we still don't know the basic epidemiology of the pandemic, which we could have learned from random testing of the general population. Numbers reported in the media and statements by the CDC and health authorities vary widely in terms of the total number of individuals infected, the number of hospitalizations per infected person, the death rates per infected person and other pieces of basic information. We still lack any controlled studies of the effectiveness of facemasks at reducing infection and death rates in the real world, even though such studies would be easy to conduct. It is very hard to know what is actually going on, given that statements by medical authorities are variable, inconsistent and not based on adequate science. When the CDC and the WHO make opposite statements about the need for asymptomatic individuals to wear facemasks in public, both cannot be right. Although the WHO statement below refers to influenza viruses and the CDC statement to COVID-19, the protective effects of facemasks are the same for both since the viruses are all far smaller than the pore size of masks and cloth coverings worn by the public.

## WHO

“No recommendation can be made at this time for mask use in the community by asymptomatic persons, including those at high risk for complications, to prevent exposure to influenza viruses.

<https://www.cdc.gov/flu/professionals/infectioncontrol/maskguidance.htm>

## CDC

“While people who are sick or know that they have COVID-19 should isolate at home, COVID-19 can be spread by people who do not have symptoms and do not know that they are infected. That’s why it’s important for everyone to practice social distancing (staying at least 6 feet away from other people) and wear cloth face coverings in public settings. Cloth face coverings provide an extra layer to help prevent the respiratory droplets from traveling in the air and onto other people.”

## References

1. Lyu W, Wehby GL (2020) Community use of face masks and COVID-19: Evidence from a natural experiment of state mandates in the US. *Health Affairs*: doi.org/10.1377/hlthaff.2020.00828.
2. Richardson S, Hirsch JS, Narasimhan M, Crawford M, McGinn T, et al. (2020) Presenting characteristics, comorbidities, and outcomes among 5700 patients hospitalized with COVID-19 in the New York City area. *JAMA* 323: 2052-2059. [[crossref](#)]



# Facemasks are Not Effective for Preventing Transmission of the Coronavirus

On February 29, 2020, Jerome Adams, the Surgeon General of the United States, tweeted that, “They [facemasks] are NOT effective in preventing general public from catching coronavirus.” Within a few months, he and the Centers for Disease Control and Prevention (CDC) were stating that facemasks are effective for preventing transmission of viral illnesses in the community, and within a short time, governments in the United States and elsewhere were mandating the wearing of facemasks in public. The explanation for this reversal in policy focused on symptomatic carriers in public. However, the evidence from Randomized Controlled Trials (RCTs) indicates that surgical facemasks have no effect on the transmission of viral illnesses in the community. Based on their physical characteristics, one would not expect surgical facemasks to reduce viral transmission by asymptomatic carriers. The size of a coronavirus is about 0.1 microns and the pore size of surgical masks is in the range of 50-100 microns: the pores are 500-1000 times the size of the virus. Aerosol droplets are about 3 microns in diameter, so surgical masks would not be expected to block them either.

A common rationale for wearing masks in public is that their purpose is not to protect you from others, but to protect others from you if you are an asymptomatic carrier: this is illogical. How can a mask protect someone else from you if it does not protect you from someone else? Also, asymptomatic carriers are, by definition, not coughing or sneezing in public, except very infrequently. Normal breathing and speaking emits primarily aerosols not droplets; droplets are the main concern for transmission of the coronavirus in public. Infectious symptomatic carriers who are emitting virus-laden droplets should be in quarantine, therefore it is not necessary to mandate facemasks to protect the public from them.

Four meta-analyses published to date report that no Randomized Controlled Trial (RCT) has ever shown a significant difference in viral transmission rate with and without facemasks in the general public. Brainard, Jones, Lake, Hopper and Hunter [1] reviewed 3 RCTs and found no difference in any of them; Cowling, Zhou, Ip, Leung, and Aiello [2] reviewed 4 RCTs and found no difference in any of them; Xiao, Shiu, Gao, Wong, Fong, Ryu and Cowling [3] reviewed 10 RCTs and found no difference in any of them; and Aggarwal, Dwarakanathan, Gautam and Ray [4] reviewed 9 RCTs and found no difference in any of them. These meta-analyses by four different groups from around the world have not found a single RCT that demonstrates a protective effect of facemasks for viral transmission in the general public. In discussing the Xiao et al. [3] Meta-analysis, Greenlagh, Schmid, Czepionka, Bassler and Gruer [5] said that, “... the authors conclude that there was no significant reduction in influenza transmission with the use of facemasks.” The situation, then, is not that there is a lack of evidence: there is replicated, controlled evidence that facemasks do not reduce viral transmission in the community.

For the sake of discussion, what if we made an assumption that facemasks reduce the rate of viral transmission in the community by 5%? For this discussion, we will bear in mind that there is no evidence that facemasks reduce transmission by even this much. Further, let's assume that the infection rate in the community is 5% and the mortality rate for infected healthy people under 60 is 0.1%. This would mean that wearing facemasks would reduce one's risk of infection as a healthy person under 60 from 5% to 4.75%; the risk of death from COVID-19 would drop from 0.005% to 0.00475% due to wearing facemasks. This does not seem like a sufficient risk reduction to justify mandatory facemasks in public.

Wearing masks is not terribly inconvenient, but it does have costs in terms of dollars, an energy burden from manufacturing and distribution, and pollution pressure on landfills, bodies of water and the environment in general. Given these considerations, and the evidence from RCTs, it would seem that mandates for wearing facemasks in public should be, at the least, reduced to recommendations, until there is definitive evidence that they are effective. For any other topic in medicine, one would expect a consensus to exist if all the available RCTs and meta-analyses found that a given intervention has no effect on the target problem. One would expect authorities to state that there is no need for the intervention. If the same standards were applied to public wearing of facemasks for COVID-19, there would be neither a mandate nor a recommendation for them. As discussed recently, facemask policies are only one of many problems with how medical authorities have handled the COVID-19 epidemic; many public health recommendations and statements have not been based on science [6].

## References

1. Brainard JS, Jones N, Lake I, Hooper L, Hunter P (2020) Face masks and similar barriers to prevent respiratory illness such as COVID-19: A rapid systematic review. *Medrxiv* doi:10.1101/2020.04.01.20049528.
2. Cowling BJ, Zhou Y, Ip DK, Leung GM, Aiello AE (2010) Face masks to prevent transmission of influenza virus: a systematic review. *Epidemiology of Infections* 138: 449-456. [[crossref](#)]
3. Xiao J, Shiv EYC, Gao H, Wong JY, Fong MW, et al. (2020) Nonpharmaceutical measures for pandemic influenza in non-healthcare settings – personal protective and environmental measures. *Emerging Infectious Diseases* 26: 967-975.
4. Aggarwhal N, Dwarakananthan V, Gautham N, Ray A (2020) Facemasks for prevention of viral respiratory infections in community settings: A systematic review and meta-analysis. *Indian Journal of Public Health* 64: 192-200.
5. Greenhalgh T, Schmid MB, Czypionka T, Bassler D, Gruer L (2020) Facemasks for the public during the COVID-19 crisis. *British Medical Journal* 369: m1435. [[crossref](#)]
6. Ross CA (2020) Thoughts on COVID-19. *Journal of Neurology and Neurocritical Care* 3: 1-3.

Research Open

# How Misinformation that Facemasks are Effective for Reducing COVID-19 is Transmitted

The evidence from randomized controlled trials (RCTs) that surgical facemasks and cloth facemasks are ineffective for preventing transmission of respiratory viruses in public is conclusive [1-8]. In all the meta-analyses of all the existing RCTs [4-7], not a single trial was found in which facemasks provided any protection against virus transmission in public [1,2]. Consistent with the findings of all RCTs comparing transmission rates in public with and without facemasks, Leung et al. compared the rates of detection of three types of viruses in exhalations by infected individuals with and without facemasks: they concluded that, with facemasks, there was: “no significant reduction in detection of influenza virus in aerosols;” “For rhinovirus there were no significant differences between detection of virus with or without facemasks, both in respiratory droplets and in aerosols;” and, for coronavirus there was “no significant reduction in detection in aerosols [3].” They did observe a reduction in detection of viruses in respiratory droplets for influenza virus and coronavirus. There is no doubt that facemasks can reduce the transmission of droplets, but droplets are not the concern for transmission of viruses in public. Significant numbers of droplets are not exhaled by asymptomatic carriers because they are not coughing or sneezing in public. Symptomatic carriers who are coughing and sneezing should be quarantined. The rationale for both recommended and mandated facemasks in public is to reduce transmission by asymptomatic carriers. Since all the RCTs in the literature show no reduction in transmission of viruses in public due to facemasks, one wonders why the CDC, NIH and virtually all medical authorities are stating that there is conclusive scientific evidence that facemasks reduce viral transmission in public.

For example, Brooks, Butler and Redfield [9] stated in the July 14, 2020 issue of JAMA that, “At this critical juncture when COVID-19 is resurging, broad adoption of cloth face covering is a civic duty.” Redfield is the Director of the CDC. Similarly, Gostin, Cohen and Koplan [10] stated in the August 11, 2020 issue of JAMA that, “The ethical justification for face coverings is their utility in preventing transmission of serious disease to community members.” Gostin et al. recommend delivering a public health message of, “When we all mask up, we are all safer [10].” The scientific facts are that facemasks have no effect on the transmission of viruses in public. This is proven by multiple RCTs. And yet, the CDC, writers in JAMA, and many medical authorities, state that it is scientifically proven that facemasks will protect the public from COVID-19. What is the evidence these authorities cite as scientific proof, while ignoring and never citing the RCTs?

Brooks et al. have 14 references that provide their evidence [9]. Their first reference is a study in health care settings that provides no data on transmission in public. The second and third references are to the Massachusetts Department of Public Health website and provide no data. The fourth paper describes a web app for screening healthcare workers for COVID-19. The fifth reference, published in 2019, provides guidance for how to respond to pandemics. The sixth reference says that asymptomatic carriers can transmit the virus to others but does not discuss or provide any data on facemasks. The seventh reference says that undocumented coronavirus infections can result in transmission to others but does not discuss or provide evidence on facemasks. The eighth reference is to a 1994 physics paper that describes reduction of “respiratory jets” by facemasks but provides no evidence on viral transmission. The ninth reference discusses the filtration efficiency of facemasks but provides no data on transmission in public. The tenth reference discusses the “potential utilities” of hand washing and facemasks but provides no evidence that they work. The eleventh reference is a paper by Greenlagh et al. that provides the authors’ responses to their critics but does not provide data on transmission in public [8]. The twelfth reference describes factors affecting whether people use facemasks but no data or evidence on whether facemasks work to reduce transmission in public. The thirteenth paper describes a single situation in which two COVID-positive hair stylists wore masks at work and none of their 104 clients followed up two weeks later reported symptoms of COVID-19; 102 of the 104 clients wore facemasks themselves while at the salon. None of these 104 individuals were tested for COVID-19 and many of them could have been asymptomatic carriers. The fourteenth paper is a discussion of facemasks and Gross National Product in a Goldman Sachs Research publication.

Thus, of Brooks et al.’s fourteen references, none provide any controlled data on the effects of facemasks on transmission of viruses in public [9]. Gostin et al. provide ten references to support their assertion that it is a civic duty to wear facemasks during the COVID-19 pandemic [10]. The first reference is to a CDC website statement that facemasks work in public and should be worn in public [11]. The CDC website provides 19 references to support their recommendation, but those references consist of small or single case uncontrolled studies, discussions of asymptomatic transmission that provide no data on facemasks, papers about infections in residents of long-term care facilities, and papers about the filtration properties of facemasks. None of the CDC references provide any evidence or data that facemasks work in public to reduce the rate of viral transmission.

Returning to the Gostin et al. [10] paper, their second reference is Brooks et al. [9]. Their third reference is to a study that provides no data on reduction of viral transmission rates due to wearing facemasks in public. Their fourth reference is to a study of health care workers not of transmission in public. Their fifth reference is to a study by Lyu et al. [11] that has been previously discussed by Ross and will be discussed below [2]. Their sixth, seventh and eighth references are to single legal cases. Their ninth reference is to a 2007 book by the Institute of Medicine. Their tenth reference discusses the administrative duties of the Social Security Commissioner.

Thus, the CDC website, Brooks et al. and Gostin et al. provide a total of 43 references, none of which provide any controlled evidence that facemasks worn in public reduce the rate of coronavirus transmission [9,10]. None of these three authorities reference a single one of the RCTs, all of which found zero evidence that facemasks reduce viral transmission when worn in public. The authorities in these three examples (the CDC, Brooks et al, and Gostin, et al.), and authorities throughout the United States are virtually unanimous in saying that facemasks work, that this has been proven scientifically, and that the public should wear them. This is put forward as a recommendation at the least, and often as a mandate.

The only paper out of the 43 that provides any data on facemasks in public is a study by Lyu et al. [12]. These authors tracked the rates of COVID-19 infections in 15 states and D.C. from March 31 to May 22, 2020. They found that infection rates declined more in the states that instituted mask wearing in public compared to states that did not. The difference in rates varied from 0.9% to 2.0%. If we assume that during this time period 5% of the population became infected, this would mean that facemasks could have reduced the number of infections in the population by a maximum of  $(0.05 \times 0.02 = 0.001)$  0.1%. However, during that time period the COVID-19 curve was flattening in most of the country. More importantly, multiple variables were contributing to the rate of infections including social distancing, hand washing, quarantines, and business and school closures, so facemasks likely contributed only a fraction of 0.1%, which is not clinically meaningful and is well within the margin of error for viral disease epidemiology in the United States. The CDC's estimate of the number of flu deaths in the United States in a given year is usually stated as a being within a range of tens of thousands of cases. A fluctuation of 0.1% in the infection rate when the best CDC estimate for annual flu deaths is +/-10,000-20,000 is completely meaningless.

If single cases and small uncontrolled observational studies with weak methodology were cited to prove the effectiveness of an alternative treatment for pneumonia, a paper reporting those results would never get published in any mainstream journal; the claim that the alternative treatment was effective would be rejected by medical authorities. Yet this is the quality of evidence cited by the CDC, medical authorities and leading medical journals that facemasks are effective for reducing coronavirus transmission in public. That claim has been disproven by four meta-analyses of RCTs. In any case, there is no reason to expect surgical facemasks to work because their pore size is in the range of 50-100 microns, while the coronavirus is about 0.1 microns and aerosols are about 2-3 microns in size [1,2]. The available science shows conclusively that public facemasks don't work. This is not a conspiracy theory, an anti-masker ideological statement, or an anti-medical or anti-authority statement. It is a statement of scientific fact. Facemasks may make people feel safer, and may confer a sense of solidarity, but this is just a feeling. Medically and scientifically, facemasks do not protect the public during the COVID-19 pandemic.

Ignoring these facts will not change them. It is not possible to create confidence in organized medicine by mandating public policies that are proven to be ineffective by medical science. The medical profession is putting itself at risk for blowback by endorsing and mandating public wearing of facemasks. Once statements that facemasks work are made enough times by medical authorities, they become common knowledge, and are transmitted throughout the culture. Hopefully, at some point science, data and sound medicine will prevail. The statement that public wearing of facemasks is ineffective for reducing coronavirus infection rates has been made twice by the same group from Harvard in recent issues of the New England Journal of Medicine: "We know that wearing a mask outside health care facilities offers little, if any, protection from infection [13,14]." In conclusion, it should be noted that the author's mother is in her nineties and living in a long-term care facility. The author is fully supportive of all the COVID-19 precautions instituted at this facility including facemasks, social distancing, quarantining and restriction of visitors during the height of the pandemic and rigorous daily screening of employees. The author is also fully in support of wearing facemasks inside operating rooms. The evidence just does not support wearing facemasks in public.

## References

1. Ross CA (2020) Thoughts on COVID-19. *Journal of Neurology and Neurocritical Care* 3: 1-3.
2. Ross CA (2020) Facemasks are not effective for preventing transmission of the coronavirus. *Journal of Neurology and Neurocritical Care* 3: 1-2.
3. Leung NHL, Chu DKW, Cowling BY (2020) Respiratory virus shedding in exhaled breath and efficacy of facemasks. *Nature Medicine* 26: 676-680.

4. Brainard JS, Jones N, Lake I, Hooper L, Hunter P (2020) Face masks and similar barriers to prevent respiratory illness such as COVID-19: A rapid systematic review. *Medrxiv*. doi:10.1101/2020.04.01.20049528.
5. Cowling BJ, Zhou Y, Ip DK, Leung GM, Aiello AE (2010) Face masks to prevent transmission of influenza virus: a systematic review. *Epidemiology of Infections* 138: 449-456.
6. Xiao J, Shiv EYC, Gao H, Wong JY, Fong MW, Ryu S, et al. (2020) Nonpharmaceutical measures for pandemic influenza in nonhealthcare settings – personal protective and environmental measures. *Emerging Infectious Diseases* 26: 967-975.
7. Aggarwhal N, Dwarakanathan V, Gautham N, Ray A (2020) Facemasks for prevention of viral respiratory infections in community settings: A systematic review and meta-analysis. *Indian Journal of Public Health* 64: 192-200.
8. Greenhalgh T, Schmid MB, Czypionka T, Bassler D, Gruer L (2020) Facemasks for the public during the COVID-19 crisis. *British Medical Journal*. doi:10.1136/bmj.m1435.
9. Brooks JT, Butler JC, Redfield RR (2020) Universal masking to prevent SARS-CoV-2 transmission – the time is now. *JAMA*. doi:10.1001/jama.2020.13107.
10. Gostin LO, Cohen IG, Koplan JP (2020) Universal masking in the United States. The role of mandates, health education and the CDC. *JAMA* doi:10.1001/jma.2020.15271.
11. Centers for Disease Control and Prevention (2020) <https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/cloth-face-cover-guidance.html>.
12. Lyu W, Wehby GL (2020) Community use of face masks and COVID-19: Evidence from a natural experiment of state mandates in the US. *Health Affairs*. doi.org/10.1337/hlthaff.2020.00828.
13. Klompas M, Morris CA, Sinclair J, Pearson M, Shenoy ES (2020) universal masking in hospitals in the COVID-19 era. *New England Journal of Medicine* 382: e62-63.
14. Klompas M, Morris CA, Shenoy ES (2020) Universal masking in the COVID-19 era. *New England Journal of Medicine* 383: e9.



# Commentary: Suggested Questions for Reporters Concerning COVID-19

A great deal of inconsistent and misleading information about COVID-19 has been provided by the CDC and leading medical authorities in the United States [1-3]. For example, in February, 2020 the Surgeon General stated that there was no need to wear facemasks in public. Within a few months, the CDC, governments and leading medical authorities were strongly recommending wearing facemasks in public or instituting mandates. This change in policy was framed as being based on science, data and intervening new research. In fact, there was no new research. Medical authorities claim that their recommendations are based on science when, in fact, the evidence they cite often provides no data on facemasks at all, and ignores the existing meta-analyses of randomized controlled trials, all of which show no difference in viral transmission and infection rates with and without facemasks being worn in public [4-7]. Statements about COVID-19 made by medical authorities should not be accepted at face value and should be questioned critically. Such questioning is a standard procedure in science. What follows is a list of questions that reporters or members of the public could ask their governments, doctors and medical authorities:

1. Do you know that there are four meta-analyses of randomized controlled trials of facemasks for reducing viral infection rates in public? Have you read those papers? Do you know that all randomized controlled trials of facemasks in public demonstrated that they do not reduce infection rates?
2. Have you looked at the references on the CDC website that support the recommendation that people wear facemasks in public? Do you know that none of those references provide any evidence that facemasks actually work in public? Do you know that none of those references are to the published meta-analyses?
3. Do you know that in February, 2020 the Surgeon General of the United States said very emphatically that there is no need to wear facemasks in public? This policy was changed based on the claim that new research and data had been gathered since. Do you know that there was in fact no such research or data? Can you provide any references for new research on facemasks in public published between February and May, 2020?
4. Can you provide any data on how much of the increase in COVID-19 cases in any given time frame is due to increased testing and how much is due to an actual increase in infection rates?
5. Can you explain why the official death rate from COVID-19 was initially cited as being as high as 13% when it is actually under 1%?
6. Can you explain the pore sizes of facemasks (50-100 microns) compared to the size of viruses (0.1 microns) and respiratory aerosols (2-3 microns)? Why would you expect face masks to have any effect on transmission by asymptomatic carriers who are not coughing or sneezing and not emitting droplets?
7. What would you say if a farmer was worried about mice coming onto his property: to protect himself he puts a post in the ground every 40 feet? He sees on the Department of Agriculture website that a post every 40 feet can protect you from mice. He feels safe and reassured. Surely you would agree that a post every 40 feet cannot block out mice. True? This is exactly the same as a face mask pore of 50-100 microns blocking out virus particles and aerosols. What is the difference between facemasks and the mice example? Why do you believe that facemasks can work?
8. It has been said many times by medical authorities that the purpose of facemasks is to protect other people from you if you are an asymptomatic carrier, not to protect you from others? How is that possible? Why would facemasks protect person A from person B but not person B from person A? Do you agree that this statement by medical authorities makes no sense?
9. Since serious COVID-19 disease and death are rare in healthy people under 50, why is it necessary to lock down the entire population? Why couldn't we just have a voluntary lockdown of at-risk populations who are old, infirm or have serious medical problems?
10. Why is it often not allowed to compare COVID-19 to the flu? This is a logical comparison since both are viral illnesses. COVID-19 killed far more people than the flu in 2020 but far less than the flu killed in 1918-1919. How many deaths would you

guess there have been in people under 50 in 2020 due to COVID-19 and how many deaths from the flu? Do you think that fear of COVID-19 in healthy people under 50 is increased out of proportion to the risk? Do you think this is true of their fear of the flu but in the opposite direction?

11. How many people have been infected with the coronavirus in the United States in 2020? Why don't we know this number exactly? Do you agree that randomized testing in selected areas of the country could give us an accurate number? Why hasn't this been done? Would you agree that the number may be around 5%? 5% of 330,000,000 million = 16.5 million. Let's say there have been 220,000 deaths. That would mean a death rate of about 1.3% in infected people – correct? If 20% of people have been infected then the death rate is about 0.3% - correct? If 70% of deaths are in people over 70, then the death rate under 70 is at most about 0.4%, and possibly under 0.1% - correct? This is about the same as the annual death rate from the flu – correct?
12. According to the CDC, flu vaccines average about a 40% effectiveness and some years are as low as 9%. Correct? Authorities agree that to get herd immunity from vaccines you need an effectiveness of at least 70%. Isn't it therefore true that the odds of vaccines providing herd immunity for COVID-19 are pretty much zero? Do you agree that there has never been a successful coronavirus vaccine so far, despite many efforts?
13. Wouldn't the correct science and data-based policy be that there is no need to wear facemasks in public? If you disagree, what is the science and what are the data supporting your viewpoint?

## References

1. Ross CA (2020) Thoughts on COVID-19. *Journal of Neurology and Neurocritical Care* 3: 1-3.
2. Ross CA (2020) Facemasks are not effective for preventing transmission of the coronavirus. *Journal of Neurology and Neurocritical Care* 3: 1-2.
3. Ross CA (2020) How misinformation that facemasks are effective for reducing is transmitted. *Journal of Neurology Neurocritical Care* 3: 1-2.
4. Brainard JS, Jones N, Lake I, Hooper L, Hunter P (2020) Face masks and similar barriers to prevent respiratory illness such as COVID-19: A rapid systematic review. *Medrxiv*. doi:10.1101/2020.04.01.20049528.
5. Cowling BJ, Zhou Y, Ip DK, Leung GM, Aiello AE (2010) Face masks to prevent transmission of influenza virus: a systematic review. *Epidemiology of Infections* 138: 449-456.
6. Xiao J, Shiv EYC, Gao H, Wong JY, Fong MW, et al. (2020) Nonpharmaceutical measures for pandemic influenza in nonhealthcare settings – personal protective and environmental measures. *Emerging Infectious Diseases* 26: 967-975.
7. Aggarwhal N, Dwarakananthan V, Gautham N, Ray A (2020) Facemasks for prevention of viral respiratory infections in community settings: A systematic review and meta-analysis. *Indian Journal of Public Health* 64: 192-200.

Research Open

# Differences in Evaluation of Hydroxychloroquine and Face Masks for SARS-CoV-2

## Abstract

Current medical opinion, based on randomized controlled trials (RCTs), is that hydroxychloroquine is ineffective for treatment of SARS-CoV-2. Previous anecdotal and uncontrolled evidence that the drug might be helpful is now outweighed by RCTs. However, leading medical authorities and public health organizations such as the CDC, the Surgeon General and NIAID are strongly recommending wearing of face masks in public to reduce coronavirus transmission. Many governments and businesses are mandating face masks. These recommendations are based on weak, anecdotal, uncontrolled evidence and there are multiple meta-analyses of RCTs in the literature, not one of which found a single RCT in which face masks reduced viral transmission in public. The RCTs are ignored and not referenced on the CDC website. Organized medicine is taking the risk of serious blowback when and if the public learns that face masks are ineffective in viral pandemics. This blowback could undermine public confidence in vaccines and many other interventions and treatments for many different medical problems.

## Criteria Applied to Hydroxychloroquine for SARS-CoV-2

In a recent opinion piece in *JAMA*, Saag [1] defined the criteria for evaluating scientific medical evidence, and specifically for evaluating potential interventions for treatment and prevention of coronavirus infections. His comments included the statement that: “First, a single report based on a small, nonrandomized study must be considered preliminary and hypothesis generating, not clinically actionable. Likewise, anecdotal case reports and case series that include several cases likewise must be considered anecdotal and preliminary.” (p. 2162) These criteria are undisputed in medicine. They should be applied to all public health, pharmacological, vaccine and other preventive and treatment interventions for SARS-CoV-2. Saag applied these criteria in evaluating the effectiveness of hydroxychloroquine for the treatment of SARS-CoV-2 and concluded that: 1) based on the highest level of evidence, randomized controlled trials (RCTs), hydroxychloroquine is ineffective and should not be used, and 2) enthusiasm for hydroxychloroquine was not based on science or data, but instead was due to the politicization of the pandemic: “However, the politicization of the treatment was a more important factor in promoting interest in use of this drug. On April 4, the US president, “speaking on gut instinct,” promoted the drug as a potential treatment and authorized the US government to purchase and stockpile 29 million pills of hydroxychloroquine for use by patients with COVID-19. Of note, no health official in the US government endorsed use of hydroxychloroquine owing to the absence of robust data and concern about adverse effects.” (p. 2162).

“The clear, unambiguous, and compelling lesson from the hydroxychloroquine story for the medical community and the public is that science and politics do not mix. Science, by definition, requires diligence and an honest assessment of findings; politics not so much. The number of articles in the peer-reviewed literature over the last several months that have consistently and convincingly demonstrated the lack of efficacy of a highly hyped “cure” for COVID-19 represent the consequence of the irresponsible infusion of politics into the world of scientific evidence and discourse. For other potential therapies or interventions for COVID-19 (or any other diseases), this should not happen again” (p. 2162). The present author is in agreement with these statements by Saag concerning hydroxychloroquine for treatment of SARS-CoV-2, and evaluation of any intervention for prevention or treatment of coronavirus infections. Presumably, the large majority of physicians are in agreement with Saag on these points. Initial hopefulness about hydroxychloroquine early in the pandemic was understandable, but it is now time to abandon that drug for that indication. Public health authorities such as the CDC, the NIAID and the U.S. Surgeon General are all in agreement on that point.

## Criteria Applied to Face Masks for SARS-CoV-2

When we turn to the use of face masks for reducing coronavirus transmission in the community, a very different picture emerges. Now we see the CDC, NIAID and the Surgeon General strongly recommending the wearing of face masks in public, and we see governments and businesses mandating the wearing of face masks. This is said to be based on science and data. However, the evidence cited for the effectiveness of facemasks is anecdotal and uncontrolled. At the same time that face masks are being strongly recommended or mandated, five meta-analyses of RCTs for the use of face masks for reducing the transmission of viruses in public have not found a single RCT that

showed any effect of face masks. This is why, in their December 1, 2020 Interim Guidance on mask use in the context of COVID-19, the World Health Organization [2] stated that: “At present there is only limited and inconsistent scientific evidence to support the effectiveness of masking of healthy people in the community to prevent infection with respiratory viruses, including SARS-CoV-2” (p. 8) In support of this conclusion, the World Health Organization referenced two recent papers published in the *Annals of Internal Medicine*, one of which was a randomized controlled trial of facemasks in Denmark with 4862 participants [3] that found no evidence of a protective effect of face masks. The second reference was to a review paper [4] of seven randomized controlled trials in the community and two in health care settings that found no protective effects of facemasks. Additional meta-analyses of RCTs for wearing of face masks in public include reviews of three RCTs [5], nine RCTs [6], four RCTs [7], ten RCTs [8] and most recently eleven RCTs [9]. The meta-analysis of eleven RCTs by Pezzolo et al. [9] involved a total of 7469 participants and found the relative risk for becoming corona virus-positive in people who wore face masks compared to people who did not to be 0.92. They stated that this difference is not significant. Prior to April, 2020, the WHO, CDC, NIAID and Surgeon General were stating that there is no need to wear face masks in public to reduce transmission of any type of virus, and they had been saying so for years. Within a few months, in the United States but not in the WHO, a complete about face took place. This was justified as being based on newly emerging evidence, but in fact the new evidence was small, uncontrolled and anecdotal. As of December, 2020, the list of references on the CDC website used to justify public wearing of face masks for the COVID-19 pandemic is entirely anecdotal. Not one of the RCTs is referenced. Rather than the CDC basing its recommendation on RCTs, the RCTs are ignored.

An example of an anecdotal observational study referenced by the Director of the CDC [10], in a paper on which he is a coauthor, is a study of two coronavirus-positive salon workers who wore facemasks at work, as did 102 of their 104 exposed clients. None of the clients became ill, but none of them were tested for coronavirus so the number of asymptomatic carriers in the client group is unknown, therefore we can't reach any conclusion about the effectiveness of the face masks. In their paper, published in JAMA on July 14, 2020, the authors stated that, “At this critical juncture when COVID-19 is resurging, broad adoption of cloth face covering is a civic duty.”

In the present climate, anyone questioning the effectiveness of face masks for preventing transmission of the coronavirus in public takes the risk of being attacked as a conspiracy theorist, a right-wing extremist, a racist, a white supremacist, a narcissist, or even as being brain damaged [11]. Writing in JAMA, Miller [11] offered possible explanations for science denial in the context of the SARS-CoV-2 pandemic, specifically denial that face masks are effective for reducing coronavirus transmission in public. He stated that, “The relationship between anti-science viewpoints and low science literacy underscores new findings regarding the brain mechanisms that form and maintain false beliefs.” (p. 2255) Miller then went on to discuss how conspiracy theories that face masks do not work could be due to a variety of forms of neurological impairment including several different forms of dementia: “Conspiracy theories may bring security and calm, as with the patient with frontotemporal dementia who is content to believe they are rich.” (p. 2256) Organized medicine has maintained a stance of being based on science and data, and it has stated that the wearing of face masks in public is proven by science, when in fact the opposite is true. There are more RCTs confirming that face masks do not work than there are RCTs confirming that hydroxychloroquine does not work.

## The Pore Size of Surgical Masks

It is not physically possible for surgical masks to reduce transmission of the coronavirus by asymptomatic carriers. The size of the coronavirus is about 0.1 microns, and the size of respiratory aerosols is about 2-3 microns. The pore size of surgical masks is 50-100 microns. Wearing a mask to prevent catching or transmitting the coronavirus is like putting a stake in the ground every 40 feet to prevent mice from coming onto your property [12-14]. Uninfected people and asymptomatic carriers are not coughing and sneezing in public, so they are not emitting any significant number of larger respiratory droplets. People who are symptomatic should stay at home. Isolation and quarantining should be the public health interventions for them. Face masks were never recommended for the flu because they don't work. Face masks for coronavirus are not based on science. They may be a symbol of solidarity, a social control mechanism, an anti-hysteria strategy, or a well-intentioned effort to help people feel safe. Whatever the motives of face mask advocates, face masks are not science or data-based and are not effective for reducing coronavirus transmission in public. The medical profession is taking the risk of future blowback and loss of confidence in all its public health recommendations, including vaccines, by insisting that doctor knows best concerning face masks.

## Conclusions

Organized medicine and public health authorities have been stating for more than six months that face masks are effective for reducing coronavirus transmission in public. This is not scientifically true. If the criteria that are applied when evaluating hydroxychloroquine for COVID-19 were applied to face masks, the CDC, the Surgeon General and NIAID would be stating, as they did up till early 2020, that there is no need to wear face masks in public.

## References

1. Saag MS (2020) Misguided use of hydroxychloroquine for COVID-19: The Infusion of Politics Into Science. *JAMA*. [[crossref](#)]
2. World Health Organization (2020) Mask use in the context of COVID-19. Interim guidance, December 1, 2020.
3. Bundgaard H, Bundgaard JS, Raaschou-Pedersen DET, Buchwald CV, Todsén T, et al. (2020) Effectiveness of adding a mask recommendation to other public health measures to prevent SARS-CoV-2 infection in Danish mask wearers: A randomized controlled trial. *Annals of Internal Medicine*. [[crossref](#)]
4. Chou R, Dana T, Jungbauer R, Weeks C, McDonagh MS (2020) Masks for prevention of respiratory virus infections, Including SARS-CoV-2, in health care and community settings: A living rapid review. *Annals of Internal Medicine* 173: 542-555. [[crossref](#)]
5. Brainard J, Jones N, Lake I, Hooper L, Hunter PR (2020) Face masks and similar barriers to prevent respiratory illness such as COVID-19: A rapid systematic review. *Medrxiv*.
6. Aggarwhal N, Dwarakanathan V, Gautham N, Ray A (2020) Facemasks for prevention of viral respiratory infections in community settings: A systematic review and meta-analysis. *Indian Journal of Public Health* 64: 192-200. [[crossref](#)]
7. Cowling BJ, Zhou Y, Ip DK, Leung GM, Aiello AE, et al. (2010) Face masks to prevent transmission of influenza virus: a systematic review. *Epidemiology of Infection* 138: 449-56. [[crossref](#)]
8. Xiao J, Shiv EYC, Gao H, Wong JY, Fong MW, et al. (2020) Nonpharmaceutical measures for pandemic influenza in nonhealthcare settings – personal protective and environmental measures. *Emerging Infectious Diseases* 26: 967-975.
9. Pezzolo E, Cazzaniga S, Gallus S, et al. (2020) Evidence from randomized controlled trials on the surgical masks' effect on the spread of respiratory infections in the community. *Annals of Internal Medicine* 26 November.
10. Brooks JT, Butler JC, Redfield RR (2020) Universal masking to prevent SAR-CoV-2 transmission – the time is now. *JAMA*. [[crossref](#)]
11. Miller BL. Science denial and COVID conspiracy theories (2020) Potential neurological mechanisms and possible responses. *JAMA* 324:2255-2256. [[crossref](#)]
12. Ross CA (2020) Thoughts on COVID-19. *Journal of Neurology and Neurocritical Care* 3: 1-3.
13. Ross CA (2020) Facemasks are not effective for preventing transmission of the coronavirus. *Journal of Neurology and Neurocritical Care* 3: 1-2.
14. Ross CA (2020) How misinformation that facemasks are effective for reducing is transmitted. *Journal of Neurology Neurocritical Care* 3: 1-2.

Research Open

# mRNA Vaccines for SARS-CoV-2 are “95% Effective”: What Does That Mean?

In a recent paper, Polack et al. [1], who are members of the C4591001 Clinical Trial Group, stated that the Pfizer vaccine for SARS-CoV-2 is 95% effective. The Clinical Trial Group and their paper are funded by BioNTech and Pfizer. The statement that the mRNA vaccines for SARS-CoV-2 manufactured by Pfizer and Moderna are 95% effective has been made countless times in the media and by the heads of the CDC and NIAID and other physicians and public health authorities. But what does “95% effective” actually mean? It is a relative risk number. What are the raw data reported by Polack et al. [1]? In their trial, 21,720 participants received the active vaccine and 21,728 received placebo. Altogether, 162 participants in the placebo group developed COVID-19 illness compared to 8 in the vaccine group; 9 participants in the placebo group developed severe COVID-19 disease compared to 1 in the vaccine group. This is a reduction in COVID-19 illness of 95% (the rate of illness in the vaccine group was  $8/162 = 5\%$  of the rate in the placebo group). There were no deaths in either group. This means that there is no evidence that mRNA vaccines reduce the risk of death from COVID-19 illness.

Doing the arithmetic on the raw data, the risk of severe illness in the vaccine group was  $1/21,720 = 0.00005$ , while it was  $9/21,728 = 0.0004$  in the placebo group: expressed as percentages, the risks for severe illness were 0.005% in the vaccine group and 0.04% in the placebo group. That is, the absolute reduction in risk of severe illness conferred by the vaccine was 0.035%, less than one tenth of one percent. These results by themselves are a very remarkable finding: less than 1 in 2000 individuals in the placebo group developed a severe COVID-19 illness and none died.

If we assume that the population of the United States is 330,000,000 people and we assume that the vaccines are equally effective in children, and if we assume that 10% of the population has been infected, this means that there are 33,000,000 currently or previously infected individuals in the country. If we then assume that the vaccine reduces the risk of getting severe disease by 0.035%, this means that the number of cases of severe illness in the country would have been reduced by  $0.00035 \times 33,000,000 = 11,500$  cases if everyone got vaccinated in January, 2019. However, that number is much higher than reality, because the rates of serious COVID-19 illness are extremely low in children: the Pfizer trial enrolled only people 16 years of age or older. Polack et al. [1] state that the vaccine efficacy was the same when they controlled for age, sex, race, ethnicity, baseline body-mass index, and the presence of coexisting conditions. This means that the effectiveness of the vaccine is no higher in certain racial or ethnic groups than in others, nor is it higher in certain age groups or weight categories than others.

It is impossible to generate a precise number, but, based on the data, one must conclude that the mRNA vaccines, if administered to everyone in the United States, could prevent only a few thousand cases of serious COVID-19 illness over the next year. From the data, we know that the vaccines can prevent death in fewer than one in 21,000 people. This means that your risk of death if you get the vaccine is reduced by less than  $1/21,000 = 0.00005$  or less than 0.005%. None of these numbers have anything to do with being pro or anti-vaccine. They are just the facts. An assessment of the cost-benefit from COVID-19 mRNA vaccines should be balanced against their costs in terms of side effects, financial costs, and diversion of resources from other social and public health needs. Telling the public that the mRNA vaccines for COVID-19 are 95% effective leads to a false sense of safety and security, much like stating that face masks are effective for reducing viral transmission in public [2]. There is no evidence that mRNA vaccines reduce the rate of coronavirus transmission in public: if they do not, or do so by only a tiny amount, then it is not socially irresponsible to decline to take the vaccine. It is irresponsible not to practice social distancing and not to quarantine if symptomatic, but there is no evidence that declining the vaccine will increase anyone else's risk of serious illness or death to a meaningful extent. Public health policies should be based on these facts, not on scare tactics, a false sense of security, or political ideology distorting the data and the science.

## References

1. Polack FP, Thomas SJ, Kitchin N, Absalon J, Gurtman A et al (2020) Safety and efficacy of the BNT162b2 mRNA Covid-19 vaccine. *New England Journal of Medicine* 383: 2603-2615 [[crossref](#)]
2. Ross CA (2020) Differences in evaluation of hydroxychloroquine and face masks for SARS-CoV-2. *Journal of Neurology and Neurocritical Care* 3: 1-3.

Research Open

# Misinformation Concerning Face Masks and the Wuhan Lab Leak

Leading authorities including the CDC continue to state that face masks are effective for reducing the transmission of the SARS-CoV-2 virus in public. For example, Guy, Massetti and Sauber-Schatz [1] state that, “Universal and proper masking results in substantial community benefits.” Their reference in support of this statement is a report [2] that cites no data or studies showing that face masks reduce viral transmission in public. In a similar vein, Brooks and Butler [3] state with absolute confidence and authority that face masks are effective for reducing transmission of the coronavirus in public. In support of this claim they dismiss the relevance of a Danish randomized controlled trial [4] and over-ride its finding that face masks do not work in public by citing small observational reports. Leading public health authorities fail to reference the available randomized controlled trials of face masks versus no face masks for reducing viral transmission in public [1-3,5,6], as previously reviewed [7-10]. The one exception [3] does cite the Danish study but dismisses it. None of the available meta-analyses of these RCTs found a single trial in which face masks provided any protective effect [11-16]. The science, then, is replicated, clear, conclusive and unambiguous: face masks do not reduce viral transmission in public. That being the case, why do all leading public health authorities state with great confidence that face masks in public are necessary? In no other area of medicine are multiple meta-analyses of RCTs over-ridden by anecdotal and uncontrolled evidence [7] – for example, hydroxychloroquine for COVID-19 has been rejected by the medical establishment and the American Medical Association because an RCT was negative and the RCT over-rode the prior anecdotal, uncontrolled reports. With face masks, the situation is reversed, and anecdotal evidence outweighs multiple negative RCTs.

The fiction that face masks are effective for reducing viral transmission in public is legislated and reinforced by governments and corporations. For example, one cannot fly on commercial airlines without a face mask. Why? Why have politicians, physicians and governments bought into this misinformation? An investigative reporter should study the money trail for face mask manufacturers, whose revenue must have increased exponentially during the pandemic. Why, before the COVID-19 pandemic, did no one wear masks inside hospitals, except in operating rooms? Why did the Surgeon General of the United States make a 180-degree turn concerning facemasks from February to April, 2020, in the absence of any new scientific evidence? In early February he stated that wearing face masks in public is unnecessary and ineffective. The World Health Organization stated that face masks in public do not reduce viral transmission well into the pandemic. What is going on here? The social control mechanisms that keep the misinformation in place are clear: these are illustrated by a recent paper that won an award for the best paper in the journal that published it in 2020 [17]. The author of that paper provided a detailed analysis of why ‘anti-maskers’ and ‘anti-vaxxers’ are suffering from groupthink. This is how the propaganda works. Anyone who questions the dogma that face masks are necessary in public is described as a conspiracy nut, anti-scientific, likely a far right-wing Trump supporter, and an enemy of the public. Much of the public has bought into the misinformation and excludes ‘anti-maskers’ from the ranks of the decent and civilized.

In fact, in reality, the groupthink goes in the opposite direction: the belief that face masks in public work is entirely based on groupthink. The groupthink is irrefutably disproven by science in the form of multiple RCTs. It is the ‘pro-maskers’ who are anti-scientific. An opinion that face masks are ineffective does not mean that the person must hold similar opinions on vaccines or social distancing. Groupthink can make a person be either pro or anti-face masks/social distancing/vaccines – the three are often treated as a package. It is obvious that social distancing will reduce viral transmission – if no one came within 100 feet of another person, there could be no viral transmission, and no pandemic. The only point of debate is the necessary social distance required to reduce transmission by a major amount.

## The Wuhan Virology Lab ‘Conspiracy Theory’

Another charge of ‘conspiracy theorist’ is commonly levelled at individuals who believe that SARS-CoV-2 initially leaked out of the virology lab in Wuhan. Actually, this is a rational, reasonable, and scientifically grounded theory. What are the facts? You would think that blaming the pandemic on China would be palatable in the United States and the rest of the western world. Why the reluctance to do so? It’s not a matter of scientific caution. Many public health officials who dismiss the Wuhan lab leak as an unfounded conspiracy theory endorse the theory that the virus jumped from bats or other animals with no supporting evidence. Robert Redfield, former head of the CDC recently stated that he thinks a Wuhan lab leak is likely the origin of the pandemic [18]:

“I still think the most likely aetiology of this pathogen in Wuhan was from a laboratory, escaped. The other people don’t believe that,” said Redfield, who led the CDC under former President Donald Trump. “That’s fine. Science will eventually figure it out. It’s not unusual for respiratory pathogens that are being worked on in a laboratory to infect the laboratory worker.”

It is not plausible to dismiss a former head of the CDC as an uninformed conspiracy nut. Notice that Redfield states that he views the Wuhan lab leak as the most likely origin of the pandemic, but he does not say that it is a proven fact. He does not attack people who have a different opinion, and he states his belief that the origin of the pandemic is a scientific question. This is the attitude that should prevail concerning the effectiveness of face masks. It is a scientific question. The science weighs overwhelmingly in favor of the conclusion that face masks do not reduce viral transmission in public. Leaks from high security labs are common and this has been known for years [19-21]. For example, there is substantial evidence that the H1N1 virus escaped from a lab in China in 1977 [20]. The SARS coronavirus leaked from the Chinese National Institute of Virology in 2004 [20]:

“In April 2004, China reported a case of SARS in a nurse who had cared for a researcher at the Chinese National Institute of Virology. While ill, the researcher had traveled twice by train from Beijing to Anhui province, where she was nursed by her mother, a physician, who fell ill and died. The nurse in turn infected five third-generation cases, causing no deaths. Subsequent investigation uncovered three unrelated laboratory infections in different researchers at the NIV. At least two primary patients had never worked with live SARS virus. Many shortcomings in biosecurity were found at the NIV, and the specific cause of the outbreak was traced to an inadequately inactivated preparation of SARS virus that was used in general (that is, not biosecure) laboratory areas, including one where the primary cases worked. It had not been tested to confirm its safety after inactivation, as it should have been.”

Similarly, [20]:

“From 1963-78 the U.K. saw only four cases of smallpox (with no deaths)... that were imported by travelers from areas where smallpox was endemic. During this same period at least 80 cases and three deaths resulted from three separate escapes from two different accredited smallpox laboratories.”

A leak from the Wuhan Virology lab is a plausible theory and there have been officially confirmed leaks of coronaviruses from Chinese labs. While evaluating the evidence for and against a Wuhan lab leak, and efforts to ridicule and dismiss that theory, one should bear in mind that research at the Wuhan Institute of Virology on genetic enhancement of coronaviruses to make them more virulent has been funded by the NIH and NIAID and published in a leading medical journal, *Nature Medicine* [22]. Authors of the paper reporting the US-funded gain of function research on coronaviruses includes authors from the University of North Carolina, Harvard Medical School and the Wuhan Institute of Virology. Commentators who express horror at the fact that the Chinese military has been conducting biological warfare experiments on viruses at the Wuhan Institute of Virology generally fail to mention that the research has been funded by the NIAID. Despite a highly effective misinformation campaign stating that face masks must be worn in public, it is a scientific fact that they don’t work. Understanding how this misinformation campaign was planned, carried out and reinforced should be a priority of the medical profession and governments. The successful worldwide sale of this misinformation must have happened due to groupthink or deliberate disinformation, or a combination of the two.

## Concluding Thoughts

Why do all leading public health authorities state with great confidence that face masks in public are necessary, when the science proves they are not? There are two possible explanations: 1) the statements are misinformation, or 2) they are disinformation. If scenario (1) is the case, then one must conclude that leading public health officials are incapable of reading the scientific literature and accurately evaluating and summarizing it. If scenario (2) is the case, then these officials are knowingly stating as facts what they know to be falsehoods (the falsehood that face masks work). Both these scenarios are extremely troubling. As part of either a misinformation or a disinformation campaign, the medical profession, public health officials and leading medical journals have been lying to the public – or, reporting mistaken beliefs about face masks that they honestly believe to be true. Whichever scenario is the case, the medical profession is undermining professional confidence in physicians. Instead of accusing members of the public of groupthink, maybe we should get our own house in order.

## References

1. Guy GJ, Massetti GM, Sauber-Schatz E (2021) Mask mandates, on-premises dining, and COVID-19. *JAMA*. [[crossref](#)]

2. Honein MA, Christie A, Rose DA, Brooks JT, Meaney-Delman D, et al. (2020) CDC COVID-19 Response Team. Summary of guidance for public health strategies to address high levels of community transmission of SARS-CoV-2 and related deaths, December 2020. *MMWR Morb Mortal Wkly Rep* 69: 1860-1867. [[crossref](#)]
3. Brooks JT, Butler JC (2021) Effectiveness of mask wearing to control community spread of SARS-CoV-2. *JAMA* 325: 998-999. [[crossref](#)]
4. Bundgaard H, Bundgaard, JS, Raaschou-Pedersen DET, von Buchwald C, Todsén T, et al. (2020) Effectiveness of adding a mask recommendation to other public health measures to prevent SARS-CoV-2 infection in Danish mask wearers: A randomized controlled trial. *Annals of Internal Medicine* 174: 335-343. [[crossref](#)]
5. Brooks JT, Butler JC, Redfield RR (2020) Universal masking to prevent SAR-CoV-2 transmission – the time is now. *JAMA*. [[crossref](#)]
6. Miller BL (2020) Science denial and COVID conspiracy theories Potential neurological mechanisms and possible responses. *JAMA* 324: 2255-2256. [[crossref](#)]
7. Ross CA (2020) Differences in evaluation of hydroxychloroquine and face masks for SARS-CoV-2. *Journal of Neurology and Neurocritical Care* 3: 1-3.
8. Ross CA (2020) Thoughts on COVID-19. *Journal of Neurology and Neurocritical Care* 3: 1-3.
9. Ross CA (2020) Facemasks are not effective for preventing transmission of the coronavirus. *Journal of Neurology and Neurocritical Care* 3: 1-2.
10. Ross CA (2020) How misinformation that facemasks are effective for reducing COVID-19 is transmitted. *Journal of Neurology Neurocritical Care* 3: 1-2.
11. Chou R, Dana T, Jungbauer R, Weeks C, McDonagh MS (2020) Masks for prevention of respiratory virus infections, Including SARS-CoV-2, in health care and community settings: A living rapid review. *Annals of Internal Medicine* 173: 542-555. [[crossref](#)]
12. Brainard J, Jones N, Lake I, Hooper L, Hunter PR (2020) Face masks and similar barriers to prevent respiratory illness such as COVID-19: A rapid systematic review. *Medrxiv*.
13. Aggarwhal N, Dwarakanathan V, Gautham N, Ray A (2020) Facemasks for prevention of viral respiratory infections in community settings: A systematic review and meta-analysis. *Indian Journal of Public Health* 64: 192-200. [[crossref](#)]
14. Cowling BJ, Zhou Y, Ip DK, Leung GM, Aiello AE (2010) Face masks to prevent transmission of influenza virus: a systematic review. *Epidemiology of Infection* 138: 449-456. [[crossref](#)]
15. Xiao J, Shiu EYC, Gao H, Wong JY, Fong MW, et al. (2020) Nonpharmaceutical measures for pandemic influenza in non healthcare settings – personal protective and environmental measures. *Emerging Infectious Diseases* 26: 967-975.
16. Pezzolo E, Cazzaniga S, Gallus S, et al. (2020) Evidence from randomized controlled trials on the surgical masks' effect on the spread of respiratory infections in the community. *Annals of Internal Medicine*.
17. Forsyth DR (2020) Group-level resistance to health mandates during the COVID-19 pandemic: A groupthink approach. *Group Dynamics. Theory, Research and Practice* 24: 139-152.
18. Redfield R (2021) Interview: <https://news.yahoo.com/former-cdc-director-redfield-says-130733234.html>.
19. Wertheim JO (2010) The re-emergence of H1N1 influenza virus in 1977: A cautionary tale for estimating divergence times using biologically unrealistic sampling dates. *PLOS One* 5: 1-4. [[crossref](#)]
20. Furmanski M (2015) A brief, terrifying history of viruses escaping from labs: 70s Chinese pandemic was a lab mistake. *National Post* <https://nationalpost.com/news/a-brief-terrifying-history-of-viruses-escaping-from-labs-70s-chinese-pandemic-was-a-lab-mistake>.
21. Piper K (2019) How deadly pathogens have escaped the lab-over and over again. *VOX* <https://www.vox.com/future-perfect/2019/3/20/18260669/deadly-pathogens-escape-lab-smallpox-bird-flu>.
22. Menachery VD, Yount BL, Debbink K, Agnihothram S, Gralinski LE, et al. (2015) SARS-like cluster of circulating bat coronaviruses shows potential for human emergence. *Nature Medicine* 21: 1508-1513.

Research Open

# COVID Face Masks and the Wuhan Lab Escape Theory: An Update

## Developments Concerning the Wuhan Lab Leak Theory

Only a few months ago, a commentary, with supporting evidence, and a supporting quotation from the former head of the CDC, that the Wuhan lab leak theory for the origin of the COVID-19 epidemic “is a rational, reasonable, and scientifically grounded theory” could have been characterized as a conspiracy theory [1]. Now, a few months later, the Wuhan lab leak theory is being acknowledged widely in the mainstream media as just that – rational, reasonable, and scientifically grounded [2,3]. The fact that Chinese military experiments have been conducted at the Wuhan Institute of Virology has recently been confirmed by Mike Pompeo, a former US Secretary of State and former Director of the CIA [3], and is stated on a US Government website [4]: “Despite the WIV presenting itself as a civilian institution, the United States has determined that the WIV has collaborated on publications and secret projects with China’s military. The WIV has engaged in classified research, including laboratory animal experiments, on behalf of the Chinese military since at least 2017.” <https://ge.usembassy.gov/fact-sheet-activity-at-the-wuhan-institute-of-virology/>

A few months ago, such a statement would have been dismissed as a conspiracy theory. The mainstream media is now pointing out that gain of function research on coronaviruses at the Wuhan Institute of Virology was funded by the NIH and NIAID [2,3]. In 2015, researchers from the United States and the Wuhan Institute of Virology published a paper in a medical journal stating that gain of function research at the Wuhan Institute of Virology was funded by the NIH and NIAID [5]. Several quotations from this paper confirm this fact: “In addition to offering preparation against future emerging viruses, this approach must be considered in the context of the US government-mandated pause on gain-of-function (GOF) studies. (p. 1512) On the basis of these findings, scientific review panels may deem similar studies building chimeric viruses based on circulating strains too risky to pursue, as increased pathogenicity in mammalian models cannot be excluded. (p. 1512) In developing policies moving forward, it is important to consider the value of the data generated by these studies and whether these types of chimeric virus studies warrant further investigation versus the inherent risks involved. (p. 1513)”

The paper describes the contributions to this gain of function research by coauthor Xing-Ye Ge at the Wuhan Institute of Virology. Despite this paper being published in 2015, until recently anyone claiming that the NIH and NIAID funded gain of function research on coronaviruses at the Wuhan Institute of Virology would have been dismissed as a conspiracy nut, and likely as a racist xenophobe. In a February, 2021 article [6], Dr Peter Ben Embarek, speaking as a member of the WHO investigation team on the origins of the COVID-19 pandemic, was quoted as dismissing the Wuhan lab leak theory. Dr. Embarek is the President of Eco Health Alliance which acted as a conduit for the NIH and NIAID funding of coronavirus gain of function research at the Wuhan Institute of Virology [2]. Funding of this research by Eco Health Alliance is acknowledged by the authors of the 2015 paper reporting that research [7].

Former US Secretary of State and Director of the CIA, Mike Pompeo was quoted as saying in a May 25, 2021 [8] article that: “It was outrageous to see scientists, even government, U.S. government scientists who were denying this when they surely must have seen the same information that I had seen,” Pompeo said. “That includes certainly Dr. Fauci as well.” <https://www.foxnews.com/politics/pompeo-outrageous-fauci-lab-leak-theory>. Dr. Fauci has been denying that NIAID funded gain of function research at the Wuhan Institute of Virology. He and Dr. Francis Collins, Director of the NIH both denied this in recent testimony to the US House Appropriations Committee. A video of Dr. Fauci making this denial is available along with a May 25, 2021 article on the topic [5]. There are only two possible explanations for Dr. Fauci’s denial of NIH and NIAID funding of coronavirus gain of function research at the Wuhan Institute of Virology: 1) he is not telling the truth, or 2) he has no idea what is going on at NIAID. Gain of function research means modifying viruses to make them more infectious and more deadly. Need we ask why the Chinese military has been funding research at the same lab in the same time period? The United States government has funded such research at the Wuhan Institute of Virology, so the US should not be pointing a finger at China.

It is an important question whether the COVID-19 pandemic originated due to the virus jumping from bats to humans in the wild or from a leak at the Wuhan Institute of Virology. However, it is more important to investigate the disinformation originating from medical leadership in the United States and the discrediting of anyone who questions government public health policies concerning COVID-19 – the discrediting is done with charges of being anti-scientific, a conspiracy nut, a racist, and a xenophobe. Curiously, but not surprisingly, the charge of anti-science is often brought against ‘conspiracy nuts’ by people who themselves are anti-scientific.

Things are changing, however. A May 28, 2021 article [9] discusses a paper in press at *Quarterly Reviews of Biophysics Discovery* [10] that provides compelling evidence that the COVID-19 virus was engineered at the Wuhan Institute of Virology as part of gain of function research conducted there. According to the author of the May 28 article, this research by Sorensen, Susrud and Dalglish, who have previously published in the same journal [11], was rejected by a number of journals before finally being published. The May 28 article states that: [Sorensen, Susrud and Dalglish] said they tried to publish their findings but were rejected by major scientific journals which were at the time resolute that the virus jumped naturally from bats or other animals to humans.

Even when former MI6 chief Sir Richard Dearlove spoke out publicly saying the scientists' theory should be investigated, the idea was dismissed as 'fake news.' Over a year later, leading academics, politicians and the media finally flipped, and have begun to contemplate the possibility that COVID-19 escaped from the Wuhan Institute of Virology in China - a lab where experiments included manipulating viruses to increase their infectiousness in order to study their potential effects on humans. Soon, hopefully, physicians and researchers will no longer be blackballed for taking the Wuhan lab leak theory seriously.

## Licensing Body Sanctions against Physicians Who Question Public Health Policies about Face Masks

We are now moving into a phase of the COVID-19 pandemic in which centralized government and regulatory bodies are threatening physicians with sanctions if they question public health policies concerning face masks for COVID-19 protection. The College of Physicians and Surgeons of Ontario recently issued a Statement concerning COVID-19 [12]: "The College is aware and concerned about the increase of misinformation circulating on social media and other platforms regarding physicians who are publicly contradicting public health orders and recommendations. Physicians hold a unique position of trust with the public and have a professional responsibility to not communicate *anti-vaccine*, anti-masking, anti-distancing and anti-lockdown statements and/or promoting unsupported, unproven treatments for COVID-19. Physicians must not make comments or provide advice that encourages the public to act contrary to public health orders and recommendations. Physicians who put the public at risk may face an investigation by the CPSO and disciplinary action, when warranted. When offering opinions, physicians must be guided by the law, regulatory standards, and the code of ethics and professional conduct. The information shared must not be misleading or deceptive and must be supported by available evidence and science."

It is a scientifically proven fact that face masks have no effect on the transmission of viruses in public and no effect on rates of disease [13-16]. This fact is based on multiple randomized controlled trials and meta-analyses. Any Ontario physician who tells patients this scientific fact is now in danger of being censored and sanctioned by the Ontario College of Physicians and Surgeons of Ontario. Perhaps, in another year, leading physicians will be stating that mandating of face masks was a well-intentioned social control tactic but is not supported by science. Perhaps medical authorities will be citing non-existent 'newly emerging data' as a justification for no longer requiring face masks in public, even for unvaccinated persons. Or perhaps not. Perhaps we will be stuck with a pandemic of iatrogenic anxiety based on fears about no longer wearing face masks.

A concluding question: what is the difference between a conspiracy theory and the truth? Answer: 6-12 months.

## References

1. Ross CA (2021) Misinformation concerning face masks and the Wuhan lab leak. *Journal of Neurology Neurocritical Care* 4: 1-3.
2. Knapton A (2021) Why the Covid Wuhan lab escape theory, dead and buried months ago, has risen again. <https://www.yahoo.com/news/why-covid-wuhan-lab-escape-152301731.html>.
3. Shaw A (2021) Pompeo says Wuhan lab was engaged in military activity alongside civilian research. <https://www.yahoo.com/news/pompeo-says-wuhan-lab-engaged-154413535.html>.
4. <https://ge.usembassy.gov/fact-sheet-activity-at-the-wuhan-institute-of-virology/>
5. Chamberlain S (2021) Fauci admits 'modest' NIH funding of Wuhan lab but denies 'gain of function'. <https://nypost.com/2021/05/25/fauci-admits-nih-funding-of-wuhan-lab-denies-gain-of-function/>.
6. Newey S (2021) Expert from WHO origins investigation warns against relying -too much on US intel' on COVID-19. <https://www.telegraph.co.uk/global-health/science-and-disease/expert-origins-investigation-warns-against-relying-much-us-intel/>
7. Menachery VD, Yount BL Jr, Debbink K, Agnihothram S, Gralinski LE, et al. (2015) A SARS-like cluster of circulating bat coronaviruses shows potential for human emergence. *Nature Medicine* 21: 1508-1513. [crossref]

8. Olson T (2021) Pompeo says it's 'outrageous' US officials, including Fauci, dismissed lab leak theory. <https://www.foxnews.com/politics/pompeo-outrageous-fauci-lab-leak-theory>.
9. Boswell J (2021) Covid-19 'has NO credible natural ancestor' and WAS created by Chinese scientists who then tried to cover their tracks with 'retro-engineering' to make it seem like it naturally arose from bats, explosive new study claims. <https://www.dailymail.co.uk/news/article-9629563/Chinese-scientists-created-COVID-19-lab-tried-cover-tracks-new-study-claims.html>.
10. Sorensen B, Susrud A, Dalglish AG (in press) A reconstructed aetiology of the SARS-Coronavirus-2 spike. *Quarterly Reviews of Biophysics Discovery*.
11. Sorensen B, Susrud A, Dalglish AG (2020) Biovacc-19: A candidate vaccine for Covid-19 (SARS-CoV-2) developed from analysis of its general method of action for infectivity. *Quarterly Reviews of Biophysics Discovery*. doi: 10.1017/qrd.2020.8.
12. College of Physicians and Surgeons of Ontario. <https://www.cpsso.on.ca/News/Key-Updates/Key-Updates/COVID-misinformation>.
13. Ross CA (2020) Differences in evaluation of hydroxychloroquine and face masks for SARS-CoV-2. *Journal of Neurology and Neurocritical Care* 3: 1-3.
14. Ross CA (2020) Thoughts on COVID-19. *Journal of Neurology and Neurocritical Care* 3: 1-3.
15. Ross CA (2020) Facemasks are not effective for preventing transmission of the coronavirus. *Journal of Neurology and Neurocritical Care* 3: 1-2.
16. Ross CA (2020) How misinformation that facemasks are effective for reducing COVID-19 is transmitted. *Journal of Neurology Neurocritical Care* 3: 1-2.

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# Thoughts on the Politics of COVID-19

In previous papers in the *Journal of Neurology and Neurocritical Care*, I have provided a scholarly, referenced, data-based analysis of misinformation provided by the CDC, governments, the NIH, NIAID and leading physicians and medical journals concerning the COVID-19 pandemic [1-6]. I have had two doses of the Pfizer vaccine and am not an anti-vaxxer. Here I will provide some thoughts on the politics and social dynamics of the response to the pandemic.

## Comparing COVID-19 to the Flu

Early in the pandemic, comparison of the SARS-CoV-2 virus to the flu was disallowed. This was peculiar since both are viral respiratory illnesses and both can have systemic complications. The 1918-1919 flu pandemic killed far more people than have died from the current coronavirus pandemic. Comparison of the SARS-CoV-2 virus to the flu virus was equated with minimizing the seriousness of the current pandemic. Why? It was OK to compare the two viruses as long as you were saying that the SARS-CoV-2 virus is far more dangerous. In actual fact, of the two biggest pandemics since the end of World War I, the flu pandemic was the more deadly by far.

## Denigrating Hydroxychloroquine and Ivermectin

Two drugs for treatment of COVID-19 - hydroxychloroquine and ivermectin - have been ridiculed, lambasted and rejected by leading medical journals and the mainstream media. Both are generic, have been in use for decades and have very reasonable side effect profiles. The ridicule began before there was adequate published data to evaluate them. At the same time, remdesivir and convalescent plasma were widely endorsed by leading medical journals in the absence of adequate controlled data either to support or reject their usefulness. Why? Remdesivir and convalescent plasma proved to be either ineffective or only slightly superior to placebo. Yet both got the green light as tools to be used in a desperate situation. This is not balanced science. Backing remdesivir and convalescent plasma while putting down hydroxychloroquine and ivermectin is easy to understand – there's very little money to be made from generic drugs. The duty of the medical profession, apparently, is to denigrate generic drugs while endorsing expensive interventions that are no more effective. This makes medicine look like a sales force for drug companies – not a very good strategy for increasing trust in the medical profession, or for reducing vaccine hesitancy.

## Justifying Changes in Face Mask Policies with Non-Existent 'Emerging Data'

Except in isolation units and operating rooms, hospital staffs have never worn face masks inside hospitals, prior to the onset of the pandemic. The WHO and the US Surgeon General stated in February, 2020 that wearing face masks in public is unnecessary and does not reduce viral transmission. Within a few months, the NIH, NIAID, CDC, Surgeon General and leading medical journals did a 180-degree turn on face masks. This resulted in face masks being widely mandated. The change in policy was justified by the emergence of new data, but in fact no such data existed. In May, 2021 the CDC, governments and some large corporations changed their position on face masks in public, saying that they are not necessary, again justifying the change in policy as being based on new evidence. There was in fact no new evidence. Changes in face mask mandates and policies in both directions were said to be based on science and new data, when no such data existed. Anyone who opposed the policies, in either direction, was accused of being against science.

The claim to be science-based has been used as a propaganda tool and as a tactic to discredit dissenters – now we see that the tool has been used in both directions – to mandate face masks and to remove mandates. Why is this happening? Is the face mask manufacturing lobby that strong? Is the goal social control? Is it a motivational technique to scare people into getting vaccinated? Is it just a power trip? Any, all or none of these motives could be at work. The problem is not with the politicians – they are politicians and are always attacking the opposition.

The problem is the medical profession, which has acted as an agent of the state in contradiction to the science concerning face masks, and has attacked dissenting physicians.

## Death Counts and Infection Rates

It has been very difficult to evaluate what is going on in the pandemic because of false positive and false negative test results. Still, we have to use the best tools available. A more serious problem is the fact that hospitals have been getting paid more if they code a death as a COVID-19 death – even in the absence of a positive test. These problems create suspicion that the severity of the pandemic has been

exaggerated by the CDC and the medical profession, which in turn causes distrust and results in vaccine hesitancy. Why should the public believe the CDC and doctors about vaccines when both have been all over the map on face masks and disease rates? Instead of blaming the public, the medical profession should examine how it has contributed to vaccine hesitancy. You can fool some of the people some of the time, but you can't fool all of the people all of the time.

### **Whatever Happened To Contact Tracing and Testing?**

Early in the COVID-19 pandemic, the pillars of public health interventions were face masks, vaccines (not yet on the market), social distancing, contact tracing, lockdowns and testing. Contact tracing and testing quietly disappeared from public discussion and recommendations. Why? I don't know, but I assume that it finally became undeniable that contact tracing was futile. Other than catching COVID-19 from people you live with, in which case there's no need for contact tracing, it's impossible in most cases to figure out who you caught it from. Also, contact tracing is very labor intensive and expensive. The policy that contact tracing is essential was abandoned without any new data on its effectiveness, or any science-based rationale for the discontinuation. The talk was limited to vaccines, lockdowns, social distancing and face masks. Throughout 2020, while the need for contact tracing was disappearing, there was a lot of hyperbole about asymptomatic carriers. The threat posed by asymptomatic carriers was used to justify face mask mandates. If asymptomatic carriers are such a big threat, though, what is the point of contact tracing? A person who developed symptoms of COVID-19 would have to notify authorities, who in turn would have to notify everyone that person had come in contact with during the previous week. But then we would have to test countless people to identify the asymptomatic carriers. This could include everyone who was at a grocery store at the same time as the symptomatic person. How would all these people be identified and notified? The whole thing was logistically impossible. The two social control strategies of contact tracing and ramping up fear of asymptomatic carriers contradicted each other. No problem – we just dropped one of them. Actually, we've pretty much dropped both of them – the amount of emphasis on asymptomatic carriers in the media has dwindled a lot in 2021.

The same thing happened with testing – quietly stopping any mention of it. Up to mid-2020 there was a big emphasis on the need for testing. This need could have been met with a series of randomized testing studies in representative areas of the country, but these were never conducted. Instead, there was scattered, inconsistent testing throughout the United States. The percentage of positive tests was used to track the pandemic, and there was a lot of emphasis on getting the percentage of tests positive down under 10%. By mid-2021, public discussion about testing had pretty much vanished. Why? This doesn't make any scientific or epidemiological sense. Wouldn't we want to emphasize falling positivity rates to promote the idea that the vaccines are curbing the pandemic? Overall, recommendations about contact tracing and testing have fluctuated widely over the last 18 months, without any data being gathered or presented to the public to justify the changes. We just stopped talking about these two prior pillars of public health.

### **Disputes about Herd Immunity**

If 100% of the population had SARS-CoV-2 antibodies this would result in herd immunity and stop the pandemic. This is true no matter what percentage of the immunity comes from vaccination and what percentage from natural infection. The medical profession has been unanimous on this point. What is the problem then?

The problem has been the politicization of discussion of herd immunity to attack and discredit physicians who emphasize the natural infection component of herd immunity. The need for herd immunity has been a major selling point for vaccines by the medical profession. Generally, 70% herd immunity is regarded as the threshold goal. Anything beyond that is welcome, but anything less leaves us relatively unprotected. This is true. Emphasizing natural immunity has been equated with being anti-science and anti-vaccine. Why? If 40% of people get vaccinated and an additional 40% have natural immunity due to being infected, then we have reached meaningful herd immunity. It doesn't matter what the numbers are – the principle remains the same. Herd immunity is the sum of vaccine-derived immunity and infection-derived immunity. Unfortunately, we don't have an exact figure for the percentage of the population that has been infected, even though an accurate figure +/- a small margin of error could be obtained by random sampling across the nation., at a low cost compared to the total financial burden of the pandemic.

Rather than attacking physicians who emphasize the natural immunity component of herd immunity, the public should be informed that in order to reach 70% herd immunity, fewer than 70% of people need to be vaccinated. Instead, the natural immunity component is not mentioned and is left out of the analysis. That may be fine as a motivational strategy for people to get vaccinated, but it is not science. Why can't we have a rational, data-based discussion of herd immunity, rather than polarized political warfare? I don't mean among politicians – I mean in the medical profession.

## **Attributing Reductions in Infections and Deaths to the Vaccines**

Dropping rates of hospitalizations and deaths from COVID-19 in spring, 2021 have been widely attributed to the vaccines by the medical profession and public health officials. There is little mention of the fact that viral illness rates always go down in the summer. It could be that the vaccines are contributing but it could be that it is all due to the change in seasons. Most likely it is a combination of both. The percentage of the population vaccinated is far below the threshold for meaningful herd immunity, so it can't all be due to vaccines. A balanced, data-based, analytical discussion of the contributions to falling rates is not allowed because that might interfere with promoting vaccines. Again, this could be fine as a public health and population control strategy, but it is not science-based.

## **Discounting the Social and Economic Costs of Lockdowns**

An analysis of the costs and benefits of any medical or public health intervention is a standard approach. The gold standard is randomized controlled trials (RCTs) – everyone in medicine agrees on that, even though RCTs are not always feasible or available. Interventions that cause substantial morbidity and mortality such as chemotherapy and some surgical procedures are nevertheless ethical to prescribe. If more people die without the intervention than die from it, it is good medicine to recommend the intervention, after an informed consent discussion with the patient. No one disputes this in medicine. Anti-vaxxers who are alarmed about cases of post-vaccine morbidity and mortality fail to understand the principle of cost-benefit analysis. They also fail to take into account the base rate of the morbidity and mortality in the general population. They are alarmists for no sound scientific reason.

The medical profession makes the opposite error. For example, they belittle anyone concerned about severe vaccine side effects but either ignore or are unaware of the fact that the government of the United States has awarded over \$4,000,000,000.00 due to vaccine damages. This has been done through the Vaccine Court – the National Vaccine Injury Compensation Program. This Court has a very high threshold of proof.

There are no other legal remedies for vaccine injuries because vaccine manufacturers and doctors are immune from liability for vaccine injuries. Vaccines are the only medical or public health intervention with such liability protection. Why is that?

The problem is not the desire to encourage people to get vaccinated. The problem is ignoring or distorting the science by making global statements that vaccines are 'safe and effective' – some years the flu vaccine is under 10% effective according to the CDC, whereas the measles and COVID-19 vaccines appear to be over 90% effective. Global statements that vaccines are 'safe and effective' are not based on science. The base rate, morbidity and mortality of a disease in the general population, and the effectiveness and adverse effects of a vaccine for it all have to be weighed in reaching an evidence-based decision. The Vaccine Adverse Event Reporting System (VAERS) currently has over 4,000 reported deaths related to COVID-19 vaccines, far more than the combined total for all other vaccines over a longer time period. When VAERS deaths from other vaccines are low, this is hailed as proof that the vaccines are safe. When they are high for COVID-19 vaccines, anyone who points this out is attacked and discredited as anti-science and an anti-vaxxer. The same is true for the costs of lockdown – economic, mental health, relationship, educational, on and on – not to mention opiate overdoses, murders, domestic violence, child abuse and blocked access to surgery, cancer treatment and other medical services. The medical profession and public health authorities have not provided a balanced cost-benefit analysis. Instead they have attacked and belittled anyone who emphasizes the cost side of the equation and have characterized them as not caring about grandma. Maybe the quality of grandma's last year of life was severely impacted by the lockdowns. The fact that lockdowns have substantial costs doesn't automatically mean they are bad. But ignoring the cost side of the equation is politics not science.

## **If Trump is for it, We are against it**

If Trump is for it, we are against it. This theme has continued throughout the pandemic: whatever Trump says has to be attacked and discredited. Physicians who attacked Trump for politicizing the pandemic have been politicizing it themselves, but in the opposite direction. For them God is on the anti-Trump side. While doing so these physicians have adopted the pose of being science-based and have attacked people who disagreed with them as being unscientific. Actually, science is on neither side. An example is the once-ridiculous Trump conspiracy theory that the pandemic originated from a leak at the Wuhan Institute of Virology. This theory was savagely belittled as Trump nonsense. Now, Biden is being hailed for taking it seriously. The medical profession has been – by and large – marching to the same drummer. The further away we get from the Trump administration, the more easily his policies can be rehabilitated as Biden corrections to Trumpian excesses and errors – even when they are the same policies. All credit for vaccine rollout to Biden, none to Trump. Biden makes this claim because he is a politician – the medical profession should not agree with him. Credit should be given where credit is due; it should not be distributed as a political favor. The medical profession needs to get its house in order. It needs to be based, as much as possible, on data, science and rational analysis, not on partisan politics disguised as science.

## References

1. Ross CA (2021) Misinformation concerning face masks and the Wuhan lab leak. *Journal of Neurology Neurocritical Care* 4: 1-3.
2. Ross CA (2020) Differences in evaluation of hydroxychloroquine and face masks for SARS-CoV-2. *Journal of Neurology and Neurocritical Care* 3: 1-3.
3. Ross CA (2020) Thoughts on COVID-19. *Journal of Neurology and Neurocritical Care* 3: 1-3.
4. Ross CA (2020) Facemasks are not effective for preventing transmission of the coronavirus. *Journal of Neurology and Neurocritical Care* 3: 1-2.
5. Ross CA (2020) How misinformation that facemasks are effective for reducing COVID-19 is transmitted. *Journal of Neurology Neurocritical Care* 3: 1-2.
6. Ross CA (2021) COVID Face masks and the Wuhan lab escape theory: An update. *Journal of Neurology Neurocritical Care* 4: 1-3.

Research Open

# How the Medical Profession Contributes to COVID-19 Vaccine Hesitancy

Hopefully the pandemic will be over within another year. In the meantime, the medical profession and public health officials continue to denigrate and sanction ‘anti-maskers’ and ‘anti-vaxxers’, as discussed in previous papers [1-6]. This behavior inflames the people characterized as anti-vaxxers and anti-maskers, increases polarization, and breeds distrust in the medical profession. These effects of the denigration and sanctions can do nothing but increase vaccine hesitancy. The medical profession should stop putting all blame for vaccine hesitancy on a misinformed public, and instead should examine its own contributions to vaccine hesitancy. I am double vaccinated. There are a number of topics that illustrate the unhelpful attitudes and unscientific statements of doctors and public health officials during the pandemic. These are reviewed below.

## Ivermectin

Ivermectin for COVID-19 has been attacked aggressively in the courts, the media and the medical literature as being ineffective. It has been referred to as a ‘horse worm drug’ even though it has long been approved by the FDA for use in humans. The main study cited to justify the banning of ivermectin from clinical practice randomized 238 patients with mild-moderate COVID-19 to ivermectin and 238 to placebo [7]. The authors reported adverse events occurring in 77% of participants receiving ivermectin and 81.3% of those on placebo, indicating both that ivermectin is safe compared to placebo, and a high nocebo effect rate in both groups. Both groups received a 5-day course of ivermectin or placebo. There was an escalation of care to a higher level in 4 participants receiving ivermectin and 6 receiving placebo. The median time to resolution of symptoms was 10 days on ivermectin and 12 on placebo. There were no statistically significant differences between groups on any outcome measures. However, ivermectin resulted in a 17% reduction in time to symptom resolution. The authors cited four randomized controlled trials of ivermectin that had not yet been published, all with positive results, including one with substantial differences between ivermectin and placebo on a range of clinical measures [8].

Although the reduction in time to symptom resolution was not statistically significant in the JAMA study [7], a 17% reduction in duration of symptoms would result in a very large reduction in personal suffering across a large sample. If ivermectin also reduced hospitalizations and deaths by 17% in a future randomized controlled trial, that would be very helpful. Normally, in medicine, a study like this would not be used to support a ban on using the medication in hospitals or clinics. Rather, there would be a call for further research, and prescribing the medication would be regarded as a legitimate off-label use of the medication in clinical settings, given that it is generic, cheap and safe, especially if there were no more effective medications available. Although there is a posture of science and protecting patients in mainstream medicine, the behavior of the medical profession with regards to ivermectin has been starkly different from standard practice. In standard practice, the existence of a trial showing a reduction in time to symptoms resolution of 17%, plus a set of unpublished trials showing a positive effect, would never result in the aggressive dismissal of that medication. This is disturbing because such deviations from standard medicine could happen regarding any disease or treatment in the future, if politics over-ride standard practice. It doesn't matter if ivermectin proves not to be useful in properly designed future trials. The problem is the unscientific hostility towards a cheap, generic, safe and potentially useful medication. The standard mantra - “there is no evidence that ivermectin works” - is not scientifically true. That is an attitude, not a scientific statement.

## Lockdown Mandates

The justifications for lockdowns at the height of a pandemic are clear and valid, but there has been an over-use and over-reaction in government lockdown mandates. For example, as a former resident of the Northwest Territories in Canada, I was interested to read that the level of lockdown there has just been increased by the top public health physician. Why? In a population of 44,991 people [9], throughout the entire pandemic there have been 2 COVID-19 deaths [10] and 918 confirmed infections as of September 24, 2021. This is a death rate of  $2/44,991 = 0.00004$  and an infection rate of 0.02. As percentages, these are an infection rate of 2% and a death rate of 0.004%. How do those numbers justify an increased lockdown? Similarly, in the Canadian province of New Brunswick, levels of lockdown have been increased recently [11]. The province of 781,315 people has recorded 49 deaths ( $49/781,315 = 0.0006$ , or a death rate of 0.06%); the increased lockdown level is justified by one additional recent death. These lockdowns in response to those levels of threat do not make sense. This does not mean that one should be ‘anti-lockdown’, but it calls into question the judgment of public health officials. Excessive lockdowns will breed distrust in the medical profession and public health officials and fuel vaccine hesitancy.

## The Wuhan Lab Leak Theory

It is possible that the COVID-19 pandemic started with a lab leak at the Wuhan Institute of Virology [6]. It is also possible that it did not. A serious problem in the medical profession has been the vitriol and condemnation directed at anyone who supported the Wuhan lab leak theory, at least for the first year of the pandemic. This vitriol was justified by a letter in *The Lancet* on March 7, 2020 [12] in which the authors stated that: “We stand together to strongly condemn conspiracy theories suggesting that COVID-19 does not have a natural origin. . . Conspiracy theories do nothing but create fear, rumours, and prejudice that jeopardise our global collaboration in the fight against this virus. We support the call from the Director-General of WHO to promote scientific evidence and unity over misinformation and conjecture.”

The problem with this letter [12] was the major conflicts of interest that the authors did not disclose [13]. Rather, they represented themselves as objective scientists. Of the 27 authors of the letter, 26 had direct connections with the Wuhan Institute of Virology. For example: Peter Daszak and five other authors were affiliated with EcoHealth Alliance, which funded gain of function research on coronaviruses at the Wuhan Institute of Virology; three authors were affiliated with Britain’s Wellcome Trust which funded research at the Wuhan Institute of Virology; and five were coauthors of Dr. Ralph Baric, who is an author on papers from the Wuhan Institute of Virology. The *Lancet* letter was designed to shut down any suggestion that the pandemic could have started with a leak from the Wuhan Institute of Virology. This is not objective science. It is using an appearance of science for politics and self-protection. This kind of posturing by leading figures in virology and public health carries the risk of blowback once it is exposed for what it is, which in turn can do nothing but undermine confidence in public health and the medical profession.

## Treating the Unvaccinated as Untouchables

There is nothing wrong with trying to motivate people to get vaccinated for COVID-19. It seems clear that the risk for severe illness, hospitalization and death all drop substantially with vaccination. However, it is less clear that vaccination by itself reduces the rate of viral transmission in public when social distancing is in place. We know that vaccinated individuals can have break-through infections. Regardless, unvaccinated people are now being shunned, denigrated, and financially punished: they are becoming untouchables. For example, the New York Metropolitan Transportation Authority recently changed its policy to continue a \$500,000.00 death benefit for the families of employees who die of COVID-19, but canceled the benefit for families of unvaccinated employees [14]. Similarly, Southwest Airlines withheld an award of an extra 16 hours of pay from unvaccinated workers while also cutting sick pay for unvaccinated workers [15]. In New York, the Governor is considering bringing in out-of-state health care workers and declaring a state of emergency due to the number of health care workers refusing to get vaccinated [16]; recent legislation prevents them from coming to work. Bringing in out-of-state health care workers would compound staff shortages and burnout in other states. In addition, the New York state labor department issued guidance that people who lose their jobs due to vaccine refusal will not be eligible for unemployment benefits. These government actions will cause ‘anti-vaxxers’ to regard their own actions as morally justified civil unrest, which will in turn reinforce their behavior and increase the dividedness and hostility in the United States.

The motive of encouraging people to get vaccinated is fine, but these methods are not. They create two classes of citizens and punish one class financially for exercising what, up till now, has been a right. Why do we not punish smokers and the morbidly obese for occupying hospital beds and imposing costs on society, including increased insurance premiums? Such punishment would be widely regarded as a human rights violation. The difference is that unvaccinated people increase the risk of infection for others. However, smoking can increase the health risks for other people due to second-hand exposure, yet no one punishes smokers or their families financially. No-smoking areas are designed to protect people, not to punish smokers, who experience only a minor inconvenience from not being able to smoke indoors. The problem here is not the fact that vaccination rates are lower than is desirable. The problem is that public health and medicine are becoming tools for punitive social control. If unchecked, this could escalate in a dangerous direction. The medical profession has been contributing to the creation of a class of untouchables, the unvaccinated. This has been done through nasty condemnation, threats to withhold medical services, and government financial penalties. More people have died from drug overdoses in the twenty-first century than from coronaviruses. There are negative attitudes towards ‘addicts’ in both the general public and the medical profession, but the pandemic ramps such attitudes up because of the fear it generates. These negative attitudes push people away from the medical profession. There are two forces at work: doctors driving anti-maskers and anti-vaxxers further away into isolation and extremism, and extremists pulling them in that direction. Rather than attacking the attractive force, the medical profession should reduce the repulsive force.

## Face Masks

There are no randomized controlled trials that demonstrate a reduction in viral transmission in public from wearing face masks, and there are multiple trials demonstrating no effect [2,4]. A year and a half into the pandemic, the negative trials are still not referenced by doctors, the CDC, public health officials and governments who strongly recommend or mandate face masks. This is an example of politics over-riding science. Two recent studies reported by the CDC [16,17] that are characterized as providing strong evidence in favor of face masks do not actually do so. In one study [16], the authors surveyed 3142 counties but included only 16.5% of them in their final analysis, which rules out the results being representative or valid. In the other study [17], the authors surveyed 999 schools and divided them into 210 schools that adopted masking early in the study time period, 309 that adopted masks late, and 480 that never adopted a mask mandate. They reported the percentage of schools experiencing a COVID-19 outbreak during the study period, but they never defined an 'outbreak'. Whether an outbreak could be one case, or required some minimum number of cases was not stated. Thus, the no-mask schools, in principle, could have had fewer total cases than the masked schools because they had a smaller number of cases per outbreak. The authors concluded that, "this was an ecologic study, and causation cannot be inferred." In their text [17,18], the percentages of schools with outbreaks were: early mask 8.4%; late mask 32.5%; and no mask 59.2%. However, in their table the percentages were: early mask 8.0%; late mask 20.0%; and no mask 24%. The numbers in the table suggest that there was no difference between late masking and no masks – the lower percentage in the early mask schools could have been due to the virus not being as widespread in the early part of the study period, rather than a mask effect. Why doctors, public health authorities and governments recommend mask mandates remains a mystery. Mask mandates are a risky strategy because once the public catches on that face masks do not work for reducing viral transmission in public, the medical profession could experience blowback and there could be increased vaccine hesitancy.

## Concluding Thoughts

The problem outlined here is not with ivermectin, face masks, the Wuhan lab leak, or mandates as such. The problem is the misinformation being provided by doctors, governments and public health authorities during the pandemic. This misinformation can do nothing but increase distrust in the medical profession and vaccine hesitancy. Physicians have contributed to the creation of a social class of untouchables – the 'anti-maskers' and 'anti-vaxxers' – who are denigrated and accused of spreading misinformation, which they often do. But the social ostracism of this class, which includes a significant number of medical workers, is compounding the problem of vaccine hesitancy, not solving it. The medical profession should take a look at its own misinformation rather than attacking members of the public. Attacking is different from educating. This does not mean that vaccine hesitancy is entirely the medical profession's fault – but medicine should examine its own role in vaccine hesitancy and any unintended consequences of its attitudes, behavior and recommendations.

## References

1. Ross CA (2020) Thoughts on COVID-19. *Journal of Neurology and Neurocritical Care* 3: 1-3.
2. Ross CA (2020) Facemasks are not effective for preventing transmission of the coronavirus. *Journal of Neurology and Neurocritical Care* 3: 1-2.
3. Ross CA (2020) Differences in evaluation of hydroxychloroquine and face masks for SARS-CoV-2. *Journal of Neurology and Neurocritical Care* 3: 1-3.
4. Ross CA (2020) How misinformation that facemasks are effective for reducing COVID-19 is transmitted. *Journal of Neurology Neurocritical Care* 3: 1-2.
5. Ross CA (2021) mRNA vaccines for SARS-CoV-2 are "95% effective": What does that mean? *Journal of Neurology and Neurocritical Care* 3: 1-1.
6. Ross CA (2021) Misinformation concerning face masks and the Wuhan lab leak. *Journal of Neurology and Neurocritical Care* 4: 1-3.
7. Lopez-Medina E, Lopez P, Hurtado IC, Dávalos DM, Ramirez O, et al. (2021) Effect of ivermectin on time to resolution of symptoms among adults with mild COVID-19. A randomized controlled trial. *JAMA* 325: 1426-1435. [[crossref](#)]
8. Elgazzar A, Hany B, Youssef SA, Hafez M, Moussa H, et al. (2020) Efficacy and safety of ivermectin for treatment and prophylaxis of COVID-19 pandemic. *Research Square*. DOI: <https://doi.org/10.21203/rs.3.rs-100956/v2>
9. NWT Bureau of Statistics (2021) Northwest Territories population, April 2021. [https://www.statsnwt.ca/population/population-estimates/PopEst\\_Apr2021.pdf](https://www.statsnwt.ca/population/population-estimates/PopEst_Apr2021.pdf).
10. Government of the Northwest Territories (2021) COVID-19 in NWT. <https://www.gov.nt.ca/cov>.

11. Author (2021) N.B. COVID-19 roundup: Record 76 new cases and another death reported as new measures take place. *CBC*. <https://ca.yahoo.com/news/n-b-covid-19-roundup-135336077.html>.
12. Calisher C, Carroll D, Colwell R, Corley RB, Daszak P, et al (2020). Statement in support of the scientists, public health officials, and medical professionals of China combatting COVID-19. *Lancet* 395: E42-43. [crossref]
13. Knapton S (2021) It's already 'too late', but that doesn't make it pointless. *Daily Skeptic*, <https://niqnaq.wordpress.com/2021/09/14/its-already-too-late-but-that-doesnt-make-it-pointless/>.
14. Martinez J (2021) MTS yanks \$500K COVID death benefit from unvaccinated transit workers. *The City*, <https://www.thecity.nyc/2021/9/12/22667777/no-covid-death-benefit-for-unvaccinated-mta-bus-subway-workers>.
15. Dean G (2021) Southwest Airlines is giving fully vaccinated staff 16 hours extra pay – and cutting sick pay for unvaccinated workers who catch COVID-19. *Business Insider*, <https://www.businessinsider.com/southwest-airlines-covid-vaccine-incentive-pay-unvaccinated-staff-mandate-2021-9>.
16. Hayes C, Bacon J (2021) Yens of thousands of New York health care workers could lose jobs as soon as today over vaccine: covid-19 updates. <https://ca.yahoo.com/news/massachusetts-troopers-quit-over-vaccine-080021866.html>.
17. Budzyn SE, Panaggio MJ, Parks SE, Papazian M, Magid J, et al. (2021) Pediatric COVID- 19 cases in counties with and without school mask requirements – United States, July 1-September 4, 2021. *Morbidity and Mortality Weekly Report Report (MMWR)* 70: 1377-1378.
18. Jehn M, McCullough JM, Dale AP, Gue M, Eller B, et al. (2021) Association between K-12 school mask policies and school-associated COVID-19 outbreaks – Maricopa and Pima counties, Arizona, July-August 2021. *Morbidity and Mortality Weekly Report (MMWR)* 70: 1372-1373.

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