

Expert Report on Masks in the Context of Covid-19

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I. Introduction

I write this expert report as a Canadian Anesthesiologist qualified as a specialist in Canada and the USA since 1988. Anesthesiologists are the undisputed experts of breathing in co-captaincy with ENT surgeons and respirologists. Prior to specialty training in anesthesia and intensive care, I had four years of prior experience in family practice in Hudson Bay, Saskatchewan. In that practice, I did a great deal of obstetrics and pediatric care including a life-saving intubation of a 3-year-old child with epiglottitis (a severe and acute infection of the throat). I spent ten years in academia teaching and research, especially stroke. Hence, I am comfortable and familiar with the literature review needed for the purpose of the present report.

Over the last 40 years of medical practice, I have cared acutely for many children. On a personal basis, my wife, Denise, and I have raised 3 children and now have 3 grandchildren.

II. Evidence Based Medicine for Making Decisions in Science and Medicine

I have included below this useful diagram/pyramid outlining the significance of different published studies. This is key to COVID-19 mask discussion as this changed diametrically, 180 degrees, for no valid reason. I will detail this within the report but, in essence, the evidence against mask wearing for the general population is of very high quality, from the top of the pyramid, which includes Randomized Controlled Trials (RCT), Systematic Reviews and the Meta-Analyses thereof. Meanwhile, the evidence supporting mask wearing for the general population is of extremely low quality and comes well down the pyramid.¹

¹ Ioannidis, John P. "Why Most Published Research Findings Are False." *PLoS Medicine* 2, no. 8 (August 30, 2005). <https://doi.org/10.1371/journal.pmed.0020124>.



Figure 1: From Novella 2017²

It is interesting to note that the wearing of masks of any type was not recommended in the beginning few months of the COVID-19 crisis by any health organization or public health officials in Canada or Quebec.^{3, 4, 5, 6} I have reviewed the various statements made by Dr. Horacio Arruda, Public Health Director of Quebec, during press conferences in March and April 2020 concerning the non-

² Novella, Steven. "Responding to SBM Critics." *Science*, April 19, 2017. <https://sciencebasedmedicine.org/responding-to-sbm-critics/>.

³ Conférence de presse de M. François Legault, premier ministre, et Mme Danielle McCann, ministre de la Santé et des Services sociaux - National Assembly of Québec, March 2020. <http://www.assnat.qc.ca/en/actualites-salle-presse/conferences-points-presse/ConferencePointPresse-58209.html>.

⁴ Conférence de presse de M. François Legault, premier ministre et Mme Danielle McCann, ministre de la Santé et des Services sociaux - National Assembly of Québec, April 2020. <http://www.assnat.qc.ca/en/actualites-salle-presse/conferences-points-presse/ConferencePointPresse-58757.html>.

⁵ Conférence de presse de Mme Geneviève Guilbault, vice-première ministre, et Mme Danielle McCann, ministre de la Santé et des Services sociaux - National Assembly of Québec, April 2020. <http://www.assnat.qc.ca/en/actualites-salle-presse/conferences-points-presse/ConferencePointPresse-58919.html>.

⁶ Conférence de presse de M. François Legault, premier ministre, et Mme Danielle McCann, ministre de la Santé et des Services sociaux - National Assembly of Québec, April 2020. <http://www.assnat.qc.ca/en/actualites-salle-presse/conferences-points-presse/ConferencePointPresse-58993.html>.

recommendation of the wearing of masks for the general population. For the statement that were made in French, I have used a translator software to translate them in English. The various statements made by Dr Arruda, of Quebec, can be summarized as follows:

- i) The wearing of a mask does not protect the person who wears it;
- ii) The wearing of a mask gives a false impression of security;
- iii) The wearing of a mask creates a risk of auto-contamination/auto-infection;
- iv) The wearing of a mask is not part of our culture, and the population is not used to wearing such an object;
- v) It is preferable for a person to cough in her elbow and then go wash her hands rather than wearing a mask full of secretions, to touch the mask with her hands and to touch something after;
- vi) The procedural mask must be used in a controlled situation in the context of medical/health care setting;
- vii) A person must not have the impression that the mask will protect her;
- viii) It is very difficult for a person to wear a mask all day, but if a person wants to be a champion and be in the book of records, then do it;

The statements made by Dr. Arruda in March and April of 2020 were common sense and were in accordance with the existing science regarding the wearing of mask to the effect that it should be reserved for the context of medical care between doctors/health personnel and patients, as well as for sick people, and not for the general population. Further credence to this concept is seen in Dr. Anthony Fauci's email of February 2020, reproduced just below.⁷ This science has not changed since March and April 2020, to the contrary.

⁷ Carlson, Tucker. Tucker Carlson: Two-faced Fauci pushed draconian measures despite data, June 5, 2021. <https://www.msn.com/en-us/news/opinion/tucker-carlson-two-faced-fauci-pushed-draconian-measures-despite-data/ar-AAKIDIR>.

From: Fauci, Anthony (NIH/NIAID) [E]
Sent: Wed, 5 Feb 2020 03:48:11 +0000
To: Sylvia Burwell
Subject: RE: A couple of quick questions.

Sylvia:

Masks are really for infected people to prevent them from spreading infection to people who are not infected rather than protecting uninfected people from acquiring infection. The typical mask you buy in the drug store is not really effective in keeping out virus, which is small enough to pass through the material. It might, however, provide some slight benefit in keep out gross droplets if someone coughs or sneezes on you. I do not recommend that you wear a mask, particularly since you are going to a vey low risk location. Your instincts are correct, money is best spent on medical countermeasures such as diagnostics and vaccines.

Safe travels.

Best regards,
Tony

From: Sylvia Burwell [REDACTED] (b) (6)>
Sent: Tuesday, February 4, 2020 10:24 PM
To: Fauci, Anthony (NIH/NIAID) [E] [REDACTED] (b) (6)
Subject: A couple of quick questions.

Begin forwarded message:

Despite the statements made by Dr. Arruda in March and April 2020, the Quebec Government, in July 2020, decided to impose the wearing of masks for the general population in closed public places. This demonstrates the decision to impose masks to the general population was a political decision, and not a decision based on the relevant science, which was, and still is, to the effect that the wearing of masks for the general (asymptomatic) population does not protect against the transmission of a virus such as SARS-CoV-2.

This was because the published literature stated masks were not helpful and were even harmful. Any "studies" contrary to this are very low on the above pyramid, and so should be given little emphasis. For obscure and unexplained reasons, Dr. Anthony Fauci, U.S. Surgeon General, and Canadian public health officials reversed these recommendations in the summer of 2020. I suggest this was for political reasons, perhaps to reassure the population in Canada and the USA that everything that could to be done was being done, including masks. This dogma is reinforced by Worker's Compensation boards provincially and affected all places of business. I suggest this edict has caused much more harm than benefit and I will endeavor to explain this. An interesting sidebar is that recent evidence in support of

mask wearing is all in the very weak category. Meanwhile, the evidence against mask wearing is of major and of high quality, including many well done randomized controlled trials (RCT).

III. What is COVID-19 and What are the Risks?

COVID-19 is the name of a disease or syndrome which appeared in late 2019. The acronym, "COVID-19" signifies "CO" as coronavirus, "VI" as virus, and "D" as disease. The 19 is for the year first described as 2019.

Meanwhile, SARS-CoV-2 is the name of the coronavirus which triggers the illness COVID-19. In this acronym, SARS means "severe acute respiratory syndrome", CoV signifies Coronavirus, and 2 is in deference to the forerunner, SARS-CoV-1, described in 2002-2004. There have now been 7 coronaviruses experienced by humans, notably in the last 30-40 years. Three of these evolved from animal strains.

The term "corona" virus comes from the spike proteins on the virus which look like the points of a crown or corona. These are present throughout our body as they line the inner surface of all blood vessels' interior lining or endothelium. This helps explain COVID-19 complications: strokes in people 20-40 years of age, kidney disease, heart and liver failure. In addition, we now know those most susceptible to severe COVID-19 are those with co-morbidities. I have referenced both CDC and Quebec data on this.^{8,9} This revealed only 5% of all deaths from COVID-19 mention just COVID on the death certificate. All the rest had co-morbidities.

The SARS-CoV-2 virus makes many people experience excess clotting which is also called hypercoagulability. This explains also the "COVID-19 toe", described where a toe turns black due to a clot blocking the artery. No blood flow means no oxygen, and so the toe turns black. Excess clotting also explains the frequent blood clots in the leg or pelvic veins. When these clots break free, they travel to the lungs and are called pulmonary emboli. In the 1970s, these were nicknamed "Nixon's disease" as Richard Nixon, one of the former US presidents, suffered from this.

⁸ "COVID-19 Provisional Counts - Weekly Updates by Select Demographic and Geographic Characteristics." Centers for Disease Control and Prevention. Centers for Disease Control and Prevention, May 26, 2021. https://www.cdc.gov/nchs/nvss/vsrr/covid_weekly/index.htm#Comorbidities.

⁹ Simard, Marc. "Impact of Comorbidities on the Risk of Death and Hospitalization among Confirmed Cases of COVID-19 during the First Months of the Pandemic in Québec." INSPQ. Institut national de santé publique du Québec, December 14, 2020. <https://www.inspq.qc.ca/en/publications/3082-impact-comorbidities-risk-death-covid19>.

If the blood clots are too large, or there are too many, the oxygenation of the blood diminishes dramatically and can cause sudden death. If the patient initially survives, they will have very low oxygenation and their pulse oximetry, or O₂ saturation, will drop precipitously. The secondary low oxygen will trigger acute inflammation, due to hypoxia of any or all tissues. This is described as a “cytokine storm” due to the body’s rapid release of these inflammatory molecules.

In the early days of March 2020, COVID-19 death rates were high as the cases that were counted reached hospitals quite late and were usually extremely sick. This was one of the major issues in Italy, the UK, and even New York City. This initiated the incredible fear in our societies. By May and June, much more was known about COVID-19. This should have reduced our public health officials’ interventions, but it did not and still has not, namely in Quebec and most of Canada.

SARS-CoV-1 is the nearest coronavirus relative of SARS-CoV-2. They share 79.6% of the same genetics.¹⁰ SARS-CoV-1 did pose a high fatality risk with the 8,098 cases confirmed globally, causing 774 deaths with a “case fatality rate” of 9.6%. Meanwhile, the “case fatality rate” of SARS-CoV-2 is closer to 0.3% or less but is quite age particular. For example, USA CDC data describes ages 0-19 years at 0.003%, 20-40 years as 0.02%, 50-69 years as 0.5%, and aged 70 plus as 5.4%.^{11, 12}

¹⁰ Rahimi, Azadeh, Azin Mirzazadeh, and Soheil Tavakolpour. “Genetics and Genomics of SARS-CoV-2: A Review of the Literature with the Special Focus on Genetic Diversity and SARS-CoV-2 Genome Detection.” *Genomics* 113, no. 1 (January 2021): 1221–32. <https://doi.org/10.1016/j.ygeno.2020.09.059>.

¹¹ “Canada.” Worldometer. Accessed May 31, 2021. <https://www.worldometers.info/coronavirus/country/canada/>.

¹² “COVID Data Tracker Weekly Review.” Centers for Disease Control and Prevention. Centers for Disease Control and Prevention, May 28, 2021. <https://www.cdc.gov/coronavirus/2019-ncov/covid-data/covidview/index.html>.

Canadian data supplied by WHO in 2021 revealed fatalities as follows:

Years	Fatalities
0 to 9	0%
10 to 39	0.2%
40 to 49	0.4%
50 to 59	1.3%
60 to 69	3.6%
70 to 79	8.0%
80 and over	14.8%

Table 1: WHO Data of Fatalities in Canada

Unlike SARS-CoV-1, which troubled almost everyone, SARS-CoV-2 causes deaths in the very old, and greater than 95% of all deaths have one or more co-morbidities.^{11, 12} These include hypertension, diabetes mellitus, obesity, heart disease and cancer.

The mortality risk for those infected with SARS-CoV-2 is not the same for all patients. Older patients are at a higher risk of death if infected, while younger patients face a vanishingly small risk. The best advice on age-specific infection fatality rates comes from seroprevalence studies. Modern medicine has used these studies for decades with great accuracy and understanding. The definition of seroprevalence of COVID-19 is the fraction of people within a population who have specific antibodies against SARS-CoV-2 in their bloodstream. I can only guess why we do not have Canadian data as this test has been available at the major private lab in Canada, Lifelabs, in both Ontario and BC, so 19-20 million people have access. On December 27, 2020, this is where my wife and I both confirmed positive for antibodies to SARS-CoV-2. This is in contrast to the erratic and up to 95% false positive in the use of the PCR (Polymerase Chain Reaction) test being used aggressively to literally “control the numbers and narrative” by the public health officials in both Quebec and throughout Canada. By using higher 40-45 dilutions in the PCR test, they can hugely enhance the “false positive cases” and control the public narrative. However, almost no real cases of COVID-19 are clinically confirmed. Unfortunately, the media

has taken these numbers as gospel and the fear component has been increasingly ramped up as a consequence.

The USA's CDC's best estimates of the symptomatic fatality rate from COVID-19 among patients less than 50 years old is 0.05%, or 5 in 10,000; 0.2% for patients between ages 50 and 64; and 1.3% for patients 65 and above.

A study of the seroprevalence of COVID-19 in Geneva, Switzerland provides a detailed age break down of the infection survival rate: 99.9984% for patients 5 to 9 years old; 99.99968% for patients 10 to 19 years old; 99.9915% for patients 20-49 years old; 99.86% for patients 50-64 years old; and 94.6% for patients aged over 65 years.^{13, 14}

Seroprevalence assessment in Quebec and Canada reveals 2.5 to 10% presence of COVID antibodies.^{13, 14}

In summary, SARS-CoV-2 does not pose a real or imminent serious threat to the population in general, but only to the health of a specific part of the population – the elderly and a limited number of people with certain chronic conditions and/or comorbidities. Age is still the most important risk factor, with a worldwide 99.95% infection survival rate for people under 70 and 95% infection survival rate for people aged 70 years and more. In essence, the risk is little different to an annual influenza, for example, the one that affected Canada in 2017. It is important to note that COVID-19 illness when it appeared in Canada in early 2020, came after two years of quite low flu death rates. As per the USA CDC records related to flu 2017 at 61,000 deaths, 2018 had 24,000 deaths and 2019 had 22,000 deaths, though only through to March (typically runs through May for the flu season). Consequently, many of the frail elderly that would have ordinarily died from flu in 2018 and 2019 suddenly died secondary to SARS-CoV-2. However, the true SARS-CoV-2 death rate did not reach the true number of flu deaths of 2017.¹⁵ It must

¹³ Stringhini, Silvia, Ania Wisniak, Giovanni Piumatti, Andrew S Azman, Stephen A Lauer, Hélène Baysson, David De Ridder, et al. "Seroprevalence of Anti-SARS-CoV-2 IgG Antibodies in Geneva, Switzerland (SEROCoV-POP): a Population-Based Study." *The Lancet* 396, no. 10247 (June 11, 2020): 313–19. [https://doi.org/10.1016/s0140-6736\(20\)31304-0](https://doi.org/10.1016/s0140-6736(20)31304-0).

¹⁴ Perez-Saez, Francisco, Stephen Lauer, Laurent Kaiser, Simon Regard, Elisabeth Delaporte, Idris Guessous, Silvia Stringhini, and Andrew Azman. "Serology-Informed Estimates of SARS-COV-2 Infection Fatality Risk in Geneva, Switzerland." *OSF Preprints*, June 12, 2020. <https://doi.org/10.31219/osf.io/wdbpe>.

¹⁵ "2017-2018 Estimated Influenza Illnesses, Medical Visits, Hospitalizations, and Deaths and Estimated Influenza Illnesses, Medical Visits, Hospitalizations, and Deaths Averted by Vaccination in the United States."

be noted that the rules were changed by the CDC in early 2020 as deaths of people “with COVID” now included heart attacks, cancer and even gunshot wounds to the head if COVID-19 was noted in the previous 3 months. This skewed the COVID-19 deaths dramatically.

In light of the foregoing, it appears that COVID-19 does not constitute a serious threat to the health of the population, whether real or imminent, as it does not affect or pose a risk to the greater majority of the population, and only poses a risk for some people over 70 years of age.

IV. Transmission of SARS-CoV-2 from Children to Adults

The scientific data suggests the risk of transmission of the virus from younger people aged 18 and below to older people is small or negligible. Certainly, the key evidence of this is from a study in Iceland and published in the *New England Journal of Medicine* (NEJM).¹⁶ This study looked at SARS-CoV-2 virus samples in all positive cases, sequenced their genome for every case and tracked the mutation pattern of the virus. This analysis, along with contact tracing data, allowed the team to identify definitively who passed the virus to whom. The hundreds of minor mutations identified provide a unique fingerprint of sorts, which make it possible to tell whether two patients could possibly have passed the virus to one another. From this analysis, the senior author of the study, Dr. Kari Stefansson, concluded that “even if children do get infected, they are less likely to transmit the disease to others than adults. We have not found a single instance of a child infecting their parents.”¹⁷

“A French study at the L’Institut Pasteur, examined data from late April 2020 on schoolteachers, students, and their parents in Crepy-en-Valois in France.”¹⁸ This study, again using seroprevalence or antibody tests, found no evidence of virus spread to other children or teachers from known earlier cases.

Centers for Disease Control and Prevention. Centers for Disease Control and Prevention, November 22, 2019. <https://www.cdc.gov/flu/about/burden-averted/2017-2018.htm?web=1&wdLOR=c77DF78CA-7904-E54A-B008-E643C147B31E>.

¹⁶ Gudbjartsson, Daniel F., Gudmundur L. Norddahl, Pall Melsted, Kristbjorg Gunnarsdottir, Hilma Holm, Elias Eythorsson, Asgeir O. Arnthorsson, et al. “Humoral Immune Response to SARS-CoV-2 in Iceland.” *New England Journal of Medicine* 383, no. 18 (2020): 1724–34. <https://doi.org/10.1056/nejmoa2026116>.

¹⁷ Scheid, Jennifer L., Shannon P. Lupien, Gregory S. Ford, and Sarah L. West. “Commentary: Physiological and Psychological Impact of Face Mask Usage during the COVID-19 Pandemic.” *International Journal of Environmental Research and Public Health* 17, no. 18 (September 12, 2020): 6655. <https://doi.org/10.3390/ijerph17186655>.

¹⁸ Fontanet, Arnaud, Rebecca Grant, Laura Tondeur, Yoann Madec, Ludivine Grzelak, Isabelle Cailleau, Marie-Noëlle Ungeheuer, et al. “SARS-CoV-2 Infection in Primary Schools in Northern France: A Retrospective Cohort Study in an Area of High Transmission.” medRxiv. Cold Spring Harbor Laboratory Press, June 29, 2020. <https://doi.org/10.1101/2020.06.25.20140178>.

The main contacts of the younger children were their parents, of whom 61% were positive, which is consistent with parent to child spread. The authors' main conclusion from these facts is that the parents were the source of infections in school children: children were not the source.¹⁹

Irish researchers conducted a similar study which analyzed 1,160 children and adults.²⁰ They reported finding no instance of an infected child infecting another child. This was despite the fact the infected children participated in "music lessons (woodwind instruments)" and choir practice, both of these being high-risk activities for transmission.

A German study reports a strikingly similar finding on the likelihood of pediatric disease spread.²¹ The authors found the source of infection turned out to be a parent 85% of the time. They concluded that "In contrast to other epidemic viral respiratory infections, the primary source of infection with SARS-CoV-2 appears not to be other children".

One of the largest studies in the world on coronavirus in schools carried out in 100 institutions in the UK, recently confirmed that "there is little evidence that the virus is transmitted in schools" based on this extensive study.²²

A study of 23 family disease clusters in Greece, published in August 2020, found that in 91% of the clusters, an adult was the first person to be infected.²³ They found no evidence of either child-to-adult-spread, or even child-to-child.

¹⁹ Roeckner, Jared T., Nevena Krstić, Bradley H. Sipe, and Sarah G. Običan. "N95 Filtering Facepiece Respirator Use during Pregnancy: A Systematic Review." *American Journal of Perinatology* 37, no. 10 (May 21, 2020): 995–1001. <https://doi.org/10.1055/s-0040-1712475>.

²⁰ Highfield, Roger. "Coronavirus: Hunting down COVID-19." Science Museum Group, April 27, 2020. <https://www.sciencemuseumgroup.org.uk/blog/hunting-down-covid-19/>.

²¹ "COVID-19 in Primary Schools: No Significant Transmission among Children or from Students to Teachers." Institut Pasteur, June 23, 2021. <https://www.pasteur.fr/en/press-area/press-documents/covid-19-primary-schools-no-significant-transmission-among-children-students-teachers>.

²² Sian Griffiths, Education Editor. "Pupils Pose Little Risk of Spreading Covid'." News | The Sunday Times. The Sunday Times, August 9, 2020. <https://www.thetimes.co.uk/article/pupils-pose-no-risk-of-spreading-covid-27q6zfd9l>.

²³ Maltezou, Helena C., Rengina Vorou, Kalliopi Papadima, Athanasios Kossyvakis, Nikolaos Spanakis, Georgia Gioula, Maria Exindari, et al. "Transmission Dynamics of SARS-CoV-2 within Families with Children in Greece: A Study of 23 Clusters." *Journal of Medical Virology* 93, no. 3 (August 26, 2020): 1414–20. <https://doi.org/10.1002/jmv.26394>.

In the above studies, the Icelandic one is the most complete and detailed and is now the gold standard. No quality studies have disproved this study, or the other above-mentioned studies to date. In short, SARS-CoV-2 transmission of children-to-adults is very rare, and child-to-child is also quite rare.

Another approach to this topic is analyzing the effect of actual school closures on the spread of the epidemic within countries. One would expect that countries that closed schools would see a significant effect of this policy on disease spread. In fact, the opposite is the case, as suggested by studies in Japan, New South Wales, Australia, and Sweden/Finland.^{24, 25, 26} In addition, a systematic review of this evidence concluded “opening up schools and kindergartens is unlikely to impact COVID-19 mortality rates in older people,”²⁷

Newer information confirms wearing a mask of any kind increases the transmission of SARS-CoV-2 virus between individuals rather than reducing it.^{19, 20}

Admittedly, there are some counter examples in firstly Israel, and secondly, Georgia, USA.^{28, 29} “In Israel, infections among children increased steadily after schools opened. That paralleled a rise in cases nationwide”. Hence, it is difficult to determine cause and effect.

The Georgia summer camp anecdote is not a good analogy for schools.²⁹ There, the kids were older, they slept together in crowded cabins and engaged in lots of singing and screaming. Furthermore, a

²⁴ Iwata, Kentaro, Asako Doi, and Chisato Miyakoshi. “Was School Closure Effective in Mitigating Coronavirus Disease 2019 (COVID-19)? Time Series Analysis Using Bayesian Inference.” *International Journal of Infectious Diseases* 99 (July 31, 2020): 57–61. <https://doi.org/10.1016/j.ijid.2020.07.052>.

²⁵ Macartney, Kristine, Helen E Quinn, Alexis J Pillsbury, Archana Koirala, Lucy Deng, Noni Winkler, Anthea L Katelaris, et al. “Transmission of SARS-CoV-2 in Australian Educational Settings: a Prospective Cohort Study.” *The Lancet Child & Adolescent Health* 4, no. 11 (November 1, 2020): 807–16. [https://doi.org/10.1016/s2352-4642\(20\)30251-0](https://doi.org/10.1016/s2352-4642(20)30251-0).

²⁶ “Covid-19 in Schoolchildren – A Comparison between Finland and Sweden.” The Swedish Public Health Agency, July 7, 2020. <https://www.folkhalsomyndigheten.se/publicerat-material/publikationsarkiv/c/covid-19-in-schoolchildren/>.

²⁷ Ludvigsson, Jonas F. “Children Are Unlikely to Be the Main Drivers of the COVID-19 Pandemic – A Systematic Review.” *Acta Paediatrica* 109, no. 8 (May 19, 2020): 1525–30. <https://doi.org/10.1111/apa.15371>.

²⁸ Kershner, Isabel, and Pam Belluck. “When Covid Subsided, Israel Reopened Its Schools. It Didn't Go Well.” *The New York Times*. The New York Times, August 4, 2020. <https://www.nytimes.com/2020/08/04/world/middleeast/coronavirus-israel-schools-reopen.html>.

²⁹ McCabe, Caitlin. “Latest Research Points to Children Carrying, Transmitting Coronavirus.” *The Wall Street Journal*. Dow Jones & Company, August 10, 2020. <https://www.wsj.com/articles/latest-research-points-to-children-carrying-transmitting-coronavirus-11596978001>.

counter to the Georgia story is a study “of 1,900 children attending an urban summer schools camp in Barcelona, Spain.”³⁰ They “found only 39 new index cases (30 pediatric).”

This is from a recent and comprehensive report by Public Health England. English schools were reopened on June 1, 2020, despite high community case numbers, as they recognized children hardly spread SARS-CoV-2.³¹ The author stated that cases and outbreaks were “uncommon across all educational settings”. In response to this study the UK education minister Gavin Williamson said, “one of the largest studies on the coronavirus in schools in the world... makes it clear there is little evidence that the virus is transmitted at school.”³² Also, as of May 17, 2021, all UK school children and colleges will no longer require masks in school classrooms or communal areas.³³

V. Pro Mask Evidence is Weak

Before proceeding further, I will outline the “pro-mask” evidence so my outline of mask avoidance can be seen in its fullest of light. Almost all of the “pro-mask” evidence was done hurriedly and with a desired endpoint to confirm mask’s value in reducing SARS-CoV-2 transmission. This is a dangerous starting point for quality research. Most of it has been general observation, mathematic modelling and anecdotal.³⁴ The best example is from a Lancet article of June 2020.³⁵ This is “quoted” as evidence and though it sounds important as it is from a major journal, it is still at the very lowest part of the “research pyramid” shown earlier. Further evidence of this “pro-mask” change in policy comes from the June 5th, 2020, WHO, interim guidance document.³⁶

³⁰ Güell, Oriol. “Major Coronavirus Study in Spanish Summer Camps Shows Low Transmission among Children.” EL PAÍS, August 26, 2020. <https://english.elpais.com/society/2020-08-26/major-coronavirus-study-in-spanish-summer-camps-shows-low-transmission-among-children.html>.

³¹ England, Public Health. “COVID-19: Guidance for Health Professionals.” GOV.UK. GOV.UK, March 15, 2021. <https://www.gov.uk/government/collections/wuhan-novel-coronavirus>.

³² “Coronavirus: Little Evidence of Covid Transmission in Schools, Says Williamson.” BBC News. BBC, August 10, 2020. <https://www.bbc.com/news/uk-53718066>.

³³ Education, Department for. “Face Coverings No Longer Required in Schools and Colleges from 17 May.” GOV.UK. GOV.UK, May 10, 2021. <https://www.gov.uk/government/news/face-coverings-no-longer-required-in-schools-and-colleges-from-17-may>.

³⁴ Ioannidis, John P.A., Sally Cripps, and Martin A. Tanner. “Forecasting for COVID-19 Has Failed.” International Journal of Forecasting, August 25, 2020. <https://doi.org/10.1016/j.ijforecast.2020.08.004>.

³⁵ Chu, Derek K, Elie A Akl, Stephanie Duda, Karla Solo, Sally Yaacoub, Holger J Schünemann, Derek K Chu, et al. “Physical Distancing, Face Masks, and Eye Protection to Prevent Person-to-Person Transmission of SARS-CoV-2 and COVID-19: a Systematic Review and Meta-Analysis.” The Lancet 395, no. 10242 (2020): 1973–87. [https://doi.org/10.1016/s0140-6736\(20\)31142-9](https://doi.org/10.1016/s0140-6736(20)31142-9).

³⁶ World Health Organization. “Advice on the use of masks in the context of COVID-19: Interim guidance, 5 June 2020.” World Health Organization. World Health Organization, 2020. <https://apps.who.int/iris/handle/10665/332293>. License: CC BY-NC-SA 3.0 IGO

This best effort of evidence for the use of wearing masks was commissioned by the WHO and published in the Lancet in June 2020.³⁴ The title, “Physical Distancing, Face Masks, and Eye Protection to Prevent Person-to-Person Transmission of SARS-CoV-2 and COVID-19: A Systematic Review and Meta-Analysis”, sounds like high level scientific evidence. After all, systemic reviews and meta-analyses are typically considered the epitome of evidence-based medicine. However, please do not be deceived by the authors’ deceptive attempts to elevate the relevancy of this study. This systemic review/meta-analysis was entirely comprised of low-level observational studies. No high-level randomized controlled trials were included because there are none! For a more comprehensive analysis of the flaws and a relative debunking of the relevance of this study, please refer to: WHO Mask Study Seriously Flawed, Swiss Policy Research (Sept.9, 2020)³⁷

VI. Evidence in Support of “No Masks”

I will now review the research on viral transmission done in the cool of the day, before the frenzy and fear of COVID-19. I have been assisted, to a major degree, by two very recent reviews on the topic by Vainshelboim³⁸ and Kisielinski.³⁹

An excellent article published in November 2020 by Vainshelboim hypothesized the following:

1. The practice of wearing masks has compromised safety and efficacy profile.
2. Both medical and non-medical face masks are ineffective in reducing human-to-human transmission and infectivity of SARS-CoV-2 and Covid-19.
3. Wearing face masks has adverse physiological and psychological effects.
4. Long term consequences of wearing face masks on health are detrimental.

Evolution of the above hypotheses:

³⁷ “Are Face Masks Effective? The Evidence.” Swiss Policy Research, May 2021. <https://swprs.org/face-masks-evidence/>.

³⁸ Vainshelboim, Baruch. “Facemasks in the COVID-19 Era: A Health Hypothesis.” *Medical Hypotheses* 146 (November 22, 2020): 110411. <https://doi.org/10.1016/j.mehy.2020.110411>.

³⁹ Kisielinski, Kai, Paul Giboni, Andreas Prescher, Bernd Klosterhalfen, David Graessel, Stefan Funken, Oliver Kempfski, and Oliver Hirsch. “Is a Mask That Covers the Mouth and Nose Free from Undesirable Side Effects in Everyday Use and Free of Potential Hazards?” *International Journal of Environmental Research and Public Health* 18, no. 8 (April 20, 2021). <https://doi.org/10.3390/ijerph18084344>.

1. Breathing physiology

Breathing is critical to sustain life and health. Breathing removes metabolic byproducts (CO₂, carbon dioxide) and supplies fresh oxygen (O₂) which is critical to every cell for energy production (mitochondria). Chronic, mild, or moderately low O₂ and elevated CO₂ levels, such as from wearing face masks leads to reduced metabolism, acid increase in the blood (extra CO₂ dissolved becomes carbonic acid very rapidly) and increased oxidative stress. Hypoxia increases free radical production and inflammation and causes immunosuppression and health deterioration.^{40, 41, 42, 43} These deleterious effects are especially of concern in small children less than 10 years of age as I will now outline. To survive, children have a much faster metabolic rate, so they need to breathe more quickly to permit more O₂ in and more CO₂ out. Basal metabolic rate (BMR) is especially rapid from newborn to 2 years of age. The BMR slowly decreases to the adult equivalent in early adolescence.⁴⁴

2. Efficacy of face masks

The structure of both medical and non-medical (cloth) masks suggest that facemasks are ineffective to block viral particles due to their permeability to virus sized particles. The SARS-CoV-2 virus size is a diameter of 60-140 nm (nanometers or 1 billionth of a meter).⁴⁵ Meanwhile, facemask thread diameter and the relative "gap" between threads is 55-400 microns (one millionth of a meter). Hence, the virus is 1000 times smaller. Even if one states some virus particles coalesce with a water droplet, most will still penetrate the mask. In fact, the efficiency

⁴⁰ American College of Sports Medicine. ACSM's Resource Manual for Guidelines for Exercise Testing and Prescription. 6th ed. Baltimore, MD: Lippincott Williams & Wilkins, 2010.

⁴¹ Farrell, Peter A., Michael J. Joyner, and Vincent J. Caiozzo. ACSM's Advanced Exercise Physiology. 2nd ed. Philadelphia: Wolters Kluwer Health/Lippincott Williams & Wilkins, 2012.

⁴² Kenney, W. Larry, David L. Costill, and Jack H. Wilmore. Physiology of Sport and Exercise. 5th ed. Champaign, IL: Human Kinetics, 2012.

⁴³ Chandrasekaran, Baskaran, and Shifra Fernandes. "Exercise with Facemask; Are We Handling a Devil's Sword?" – A Physiological Hypothesis." *Medical Hypotheses* 144 (November 2020): 110002. <https://doi.org/10.1016/j.mehy.2020.110002>.

⁴⁴ Harris, J. A., and F. G. Benedict. "A Biometric Study of Human Basal Metabolism." *Proceedings of the National Academy of Sciences* 4, no. 12 (December 1, 1918): 370–73. <https://doi.org/10.1073/pnas.4.12.370>.

⁴⁵ Wiersinga, W. Joost, Andrew Rhodes, Allen C. Cheng, Sharon J. Peacock, and Hallie C. Prescott. "Pathophysiology, Transmission, Diagnosis, and Treatment of Coronavirus Disease 2019 (COVID-19)." *JAMA* 324, no. 8 (July 10, 2020): 782. <https://doi.org/10.1001/jama.2020.12839>.

of facemasks ranges from 0.7% to 26% in cloth masks.⁴⁶ The filtration rate of surgical and N-95 masks drops to 15% and 58% respectively, if even a small gap occurs between the mask and the face.⁴⁷ This small gap is inevitable in almost all of us. It is aggravated as the mask becomes damp or wet as we all breathe out water vapour. Air breathed out then increases through gaps as wet masks produce increased resistance. Air always follows the path of least resistance.

Clinical studies have reinforced this consideration. In a randomized controlled trial to determine if face masks or no face mask made a difference, of 246 participants, 123 (or 50%) were symptomatic.⁴⁸ Assessments revealed that masks did not make a difference to infectivity. Symptomatic participants had fever, cough, sore throat, runny nose, etc. There was no difference for coronavirus droplet transmission of greater than 5 microns (well above a single virus). This essentially removes the water droplet “stated” benefit attributed to face masks. Yes, you should still cough or sneeze into your elbow or layers of a handkerchief, but masks are no help in reducing the risk of infection. In addition, this study determined that among asymptomatic individuals, there was no droplets or aerosol coronavirus detected from anyone with or without a mask: one cannot contract COVID-19 from someone without symptoms.

A meta-analysis of healthcare workers found no difference comparing no masks, surgical masks and N-95 masks.⁴⁸ Each was not effective against viral infections or influenza-like illness based on six Randomized Control Trials. A recent review of 33,867 participants in a community setting similarly found no difference in any of the three (no mask, surgical mask or N-95 mask).⁴⁹

⁴⁶ Advice on the Use of Masks in the Community, during Home Care and in Health Care Settings in the Context of the Novel Coronavirus (2019-NCoV) Outbreak. Geneva, Switzerland: World Health Organization, 2020..

⁴⁷ Konda, Abhiteja, Abhinav Prakash, Gregory A. Moss, Michael Schmoltdt, Gregory D. Grant, and Supratik Guha. “Aerosol Filtration Efficiency of Common Fabrics Used in Respiratory Cloth Masks.” *ACS Nano* 14, no. 5 (April 24, 2020): 6339–47. <https://doi.org/10.1021/acsnano.0c03252>.

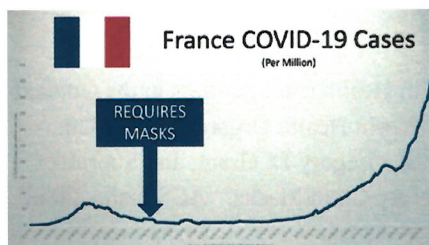
⁴⁸ Smith, Jeffrey D., Colin C. MacDougall, Jennie Johnstone, Ray A. Copes, Brian Schwartz, and Gary E. Garber. “Effectiveness of N95 Respirators versus Surgical Masks in Protecting Health Care Workers from Acute Respiratory Infection: a Systematic Review and Meta-Analysis.” *Canadian Medical Association Journal* 188, no. 8 (May 7, 2016): 567–74. <https://doi.org/10.1503/cmaj.150835>.

⁴⁹ Chou, Roger, Tracy Dana, Rebecca Jungbauer, Chandler Weeks, and Marian S. McDonagh. “Masks for Prevention of Respiratory Virus Infections, Including SARS-CoV-2, in Health Care and Community Settings.” *Annals of Internal Medicine* 173, no. 7 (October 6, 2020): 542–55. <https://doi.org/10.7326/m20-3213>.

In an earlier publication, the WHO stated that “face masks are not required as no evidence is available on its usefulness to protect non-sick persons”.⁵⁰ In the same publication, the WHO declared that “cloth” masks “are not recommended under any circumstance.”

The CDC in the US made similar recommendations, stating that only symptomatic people should consider wearing face masks.⁵¹ Meanwhile, face masks were not recommended for asymptomatic people. In addition, there are especially vulnerable populations, such as those with mental health disorders, developmental disabilities, hearing impaired, (these folks lip read which is impossible with masks), children and patients with respiratory conditions, who are at significant health risks for complications and harm from face masks. Some key respiratory conditions which can be exacerbated by face masks include asthma, and allergies causing nasal stuffiness. Furthermore, children who snore secondary to large adenoids, tonsils or airway obstructions could be at risk of harmful effects from face masks.

The following diagrams track the use of masks in affecting COVID-19 cases. In short, they are not effective in reducing transmission or preventing COVID-19. Masks were mandated when COVID-19 cases were already at either their lowest or decreasing or just before case numbers started to increase again. The graphs below demonstrate mask mandates were ineffective in several European countries, US states, and Quebec.



⁵⁰ Advice on the Use of Masks in the Context of COVID-19. Geneva, Switzerland: World Health Organization, 2020.

⁵¹ Implementation of Mitigation Strategies for Communities with Local COVID-19 Transmission. . Atlanta, Georgia: Center for Disease Control and Prevention, 2020.

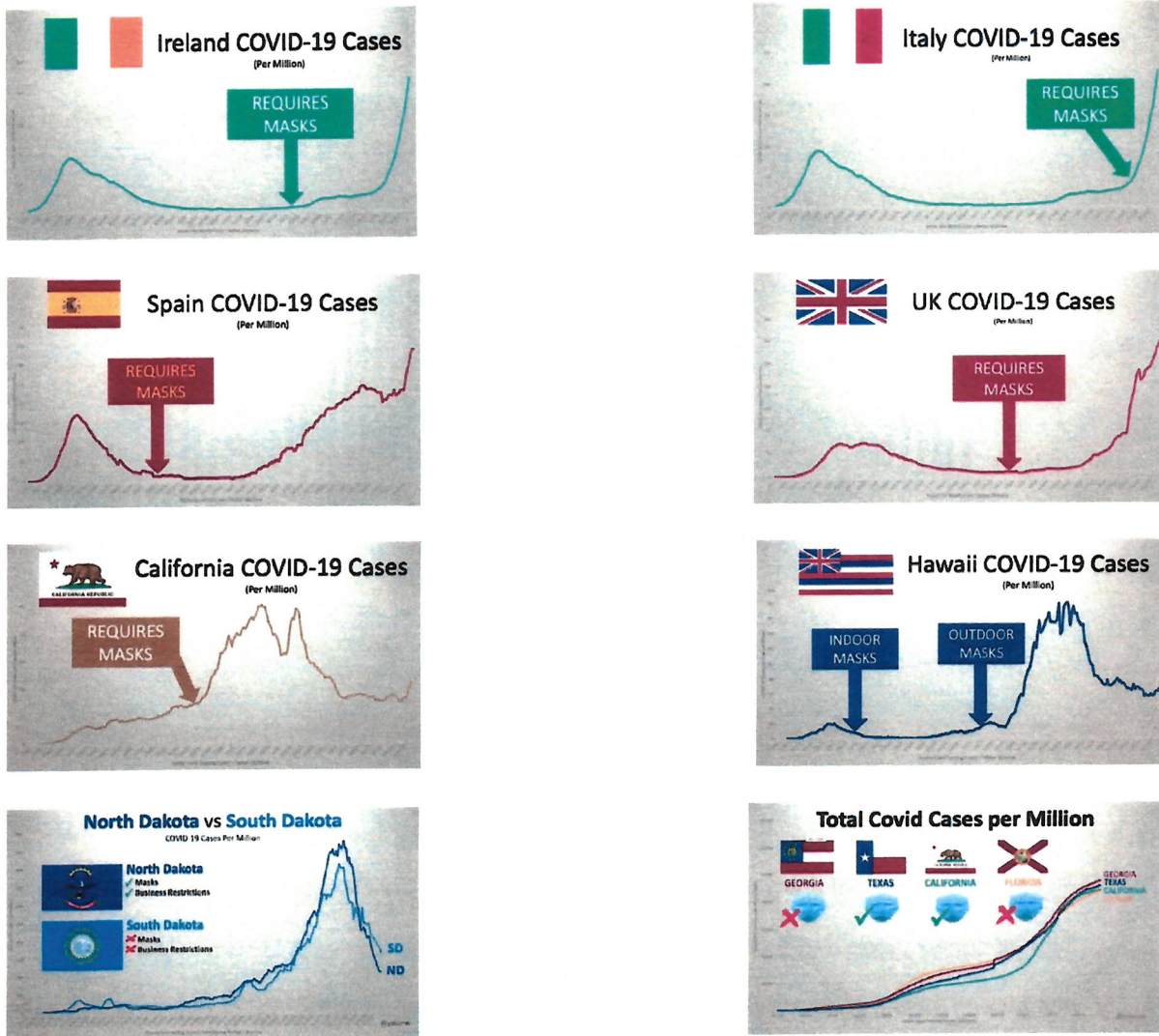


Figure 2: "Mask mandates and coronavirus infections"³⁷

In Quebec:

1.2 - Évolution du nombre de cas confirmés de COVID-19 au Québec selon le type de confirmation et la date de déclaration des cas

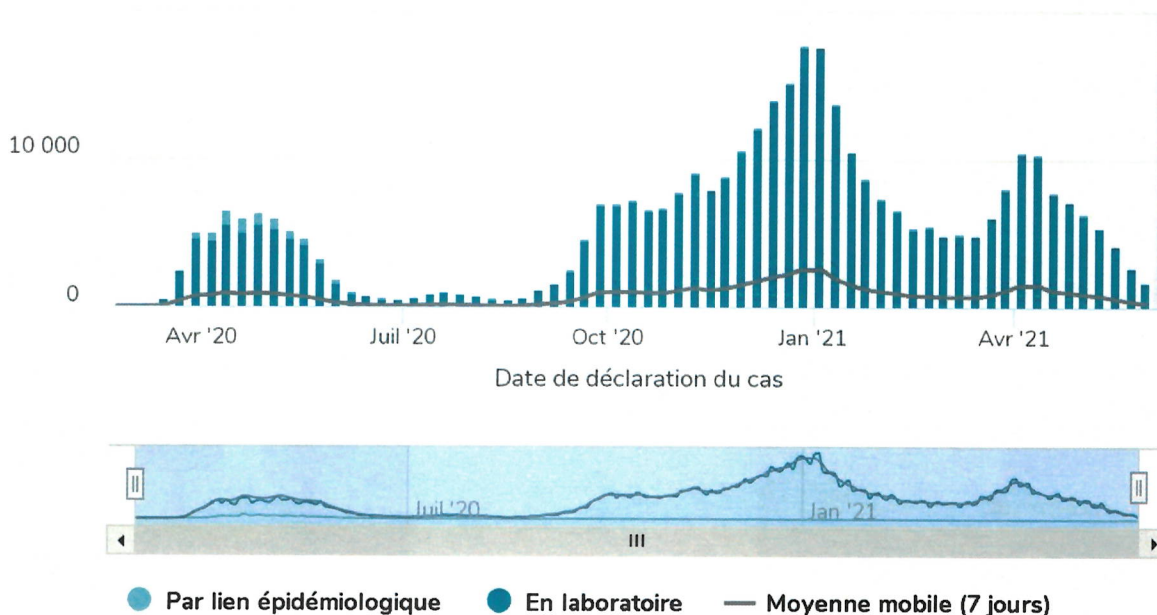


Figure 3: Evolution of the number of confirmed cases of COVID-19 in Quebec according to the type of confirmation and the date of declaration of cases.⁵²

In Quebec masks were mandated in closed public places on July 18th, 2020, at a time when the number of cases was at its lowest level. The increase in the number of cases from September 2020 shows that masks had no impact on the transmission of SARS-CoV-2.

VII. Harmful Effects and Consequences of Face Masks

1. Physiological Effects of Face masks

Wearing a face mask reduces optimal breathing by increasing the resistance of air movement while breathing in or breathing out.^{53, 54} The trapped air remaining between the mouth, nose and face mask is repeatedly rebreathed, and of course, contains lower concentration of oxygen and higher carbon dioxide concentration. This trapped air is termed “dead space” in medical

⁵² “Données COVID-19 Au Québec.” INSPQ. Accessed June 2, 2021. <https://www.inspq.qc.ca/covid-19/donnees/>.

⁵³ Farrell, Peter A., Michael J. Joyner, and Vincent J. Caiozzo. *ACSM's Advanced Exercise Physiology*. 2nd ed. Philadelphia: Wolters Kluwer Health/Lippincott Williams & Wilkins, 2012.

⁵⁴ Kenney, W. Larry, David L. Costill, and Jack H. Wilmore. *Physiology of Sport and Exercise*. 5th ed. Champaign, IL: Human Kinetics, 2012.

terms. It is often doubled with a surgical face mask. This creates lower blood O₂ (hypoxemia) and higher CO₂ in the blood (hypercapnia).^{39, 55, 56} In addition, the increased resistance to breathing causes everyone, particularly children, to increase their mouth breathing. This bypasses our nose which is our primary air filter and infection protection measure with both mucous and cilia (tiny hair cells) which deal with bacteria, viruses and fungi. The mask has all the problems of these organisms now, but no ability to deal with them biologically. The result is the rapid escalation of bacteria in the mask and also within the mouth (“mask mouth” per dentists) and lungs, even increasing pneumonia risk.^{57, 58, 59} After only 2 hours of wearing a mask, the bacteria and fungi density increase tenfold.^{60, 61} In a 230 surgical mask study, the bacterium *Staphylococcus aureus* (57% of all bacteria detected) and the fungus *Aspergillus* (31% of all fungi detected) were the dominant germs.⁶² Once a secondary bacterial pneumonia occurs in COVID-19 patients, they are at a much higher risk of needing intensive care, and even of dying.

⁵⁵ Kao, T W, K C Huang, T J Tsai, B S Hsieh, and M S Wu. “The Physiological Impact of Wearing an N95 Mask during Hemodialysis as a Precaution against SARS in Patients with End-Stage Renal Disease.” *J Formos Med Asso* 103 (2004): 624–28.

⁵⁶ “UNITED STATES DEPARTMENT OF LABOR.” 1910.134 - Respiratory Protection. | Occupational Safety and Health Administration, 2007. <https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.134>.

⁵⁷ MacIntyre, C. R., H. Seale, T. C. Dung, N. T. Hien, P. T. Nga, A. A. Chughtai, B. Rahman, D. E. Dwyer, and Q. Wang. “A Cluster Randomised Trial of Cloth Masks Compared with Medical Masks in Healthcare Workers.” *BMJ Open* 5, no. 4 (April 22, 2015). <https://doi.org/10.1136/bmjopen-2014-006577>.

⁵⁸ MacIntyre, C. R., and A. A. Chughtai. “Facemasks for the Prevention of Infection in Healthcare and Community Settings.” *BMJ* 350 (April 9, 2015). <https://doi.org/10.1136/bmj.h694>.

⁵⁹ MacIntyre, C. Raina, Quanyi Wang, Holly Seale, Peng Yang, Weixian Shi, Zhanhai Gao, Bayzid Rahman, et al. “A Randomized Clinical Trial of Three Options for N95 Respirators and Medical Masks in Health Workers.” *American Journal of Respiratory and Critical Care Medicine* 187, no. 9 (January 24, 2013): 960–66. <https://doi.org/10.1164/rccm.201207-1164oc>.

⁶⁰ Chughtai, Abrar Ahmad, Sacha Stelzer-Braid, William Rawlinson, Giulietta Pontivivo, Quanyi Wang, Yang Pan, Daitao Zhang, Yi Zhang, Lili Li, and C. Raina MacIntyre. “Contamination by Respiratory Viruses on Outer Surface of Medical Masks Used by Hospital Healthcare Workers.” *BMC Infectious Diseases* 19, no. 1 (June 3, 2019). <https://doi.org/10.1186/s12879-019-4109-x>.

⁶¹ Zhiqing, Liu, Chang Yongyun, Chu Wenxiang, Yan Mengning, Mao Yuanqing, Zhu Zhenan, Wu Haishan, et al. “Surgical Masks as Source of Bacterial Contamination during Operative Procedures.” *Journal of Orthopaedic Translation* 14 (July 2018): 57–62. <https://doi.org/10.1016/j.jot.2018.06.002>.

⁶² Luksamijarulkul, Pipat, Natkitta Aiempadit, and Pisit Vatanasomboon. “Microbial Contamination on Used Surgical Masks among Hospital Personnel and Microbial Air Quality in Their Working Wards: A Hospital in Bangkok.” *Oman Medical Journal* 29, no. 5 (September 2014): 346–50. <https://doi.org/10.5001/omj.2014.92>.

2. Masks Increase Infection Risk

It is of particular note that the moisture which accumulates on any mask causes the distribution of these germs in the form of tiny droplets via capillary action on and in the mask. This creates further contamination internally and externally with every breath.⁶³ It is now also known, from a study, that masks create a proportionally disproportionate production of fine particles in the environment and surprisingly, much more so than in people without masks.⁶⁴ This same study further revealed that all mask-wearing subjects released significantly more smaller particles of size 0.3 to 0.5 microns into the air than mask-less people, both when breathing, speaking and coughing. This occurred in cloth, surgical and N95 masks. This means that wearing masks, including surgical masks, can increase your transmission of the vulnerable particle size which readily carries viruses and is not stopped by masks. It is known that aerosol droplets of 0.09 to 3 microns in size serve as a transport medium for viruses.⁶⁵ These penetrate the well fitted surgical mask by 40%. This penetration is higher if the mask is ill fitting, or touched, which is quite inevitable in many of us, particularly children. In fact, a recently published large prospective Danish comparative study comparing mask wearers and non-mask wearers in terms of their infection rates with SARS-CoV-2 could not demonstrate any statistical difference between the groups.⁶⁶ I agree with this no difference between groups from a clinical standpoint as well, which shows that masks are, in fact, inefficient in preventing transmission of SARS-CoV-2 virus.

⁶³ Li, Y., H. Tokura, Y.P. Guo, A.S.W. Wong, T. Wong, J. Chung, and E. Newton. "Effects of Wearing N95 and Surgical Facemasks on Heart Rate, Thermal Stress and Subjective Sensations." *International Archives of Occupational and Environmental Health* 78, no. 6 (May 26, 2005): 501–9. <https://doi.org/10.1007/s00420-004-0584-4>.

⁶⁴ Asadi, Sima, Christopher D. Cappa, Santiago Barreda, Anthony S. Wexler, Nicole M. Bouvier, and William D. Ristenpart. "Efficacy of Masks and Face Coverings in Controlling Outward Aerosol Particle Emission from Expiratory Activities." *Scientific Reports* 10 (September 24, 2020): 15665 . <https://doi.org/10.1038/s41598-020-72798-7>.

⁶⁵ NCIRD. "COVID-19: Considerations for Wearing Masks." Centers for Disease Control and Prevention. Centers for Disease Control and Prevention, April 19, 2021. <https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/cloth-face-cover-guidance.html>.

⁶⁶ Bundgaard, Henning, Johan Skov Bundgaard, Daniel Emil Raaschou-Pedersen, Christian von Buchwald, Tobias Todsen, Jakob Boesgaard Norsk, Mia M. Pries-Heje, et al. "Effectiveness of Adding a Mask Recommendation to Other Public Health Measures to Prevent SARS-CoV-2 Infection in Danish Mask Wearers." *Annals of Internal Medicine* 174, no. 3 (March 2021): 335–43. <https://doi.org/10.7326/m20-6817>.

3. Physiologic Changes Secondary to Wearing a Mask

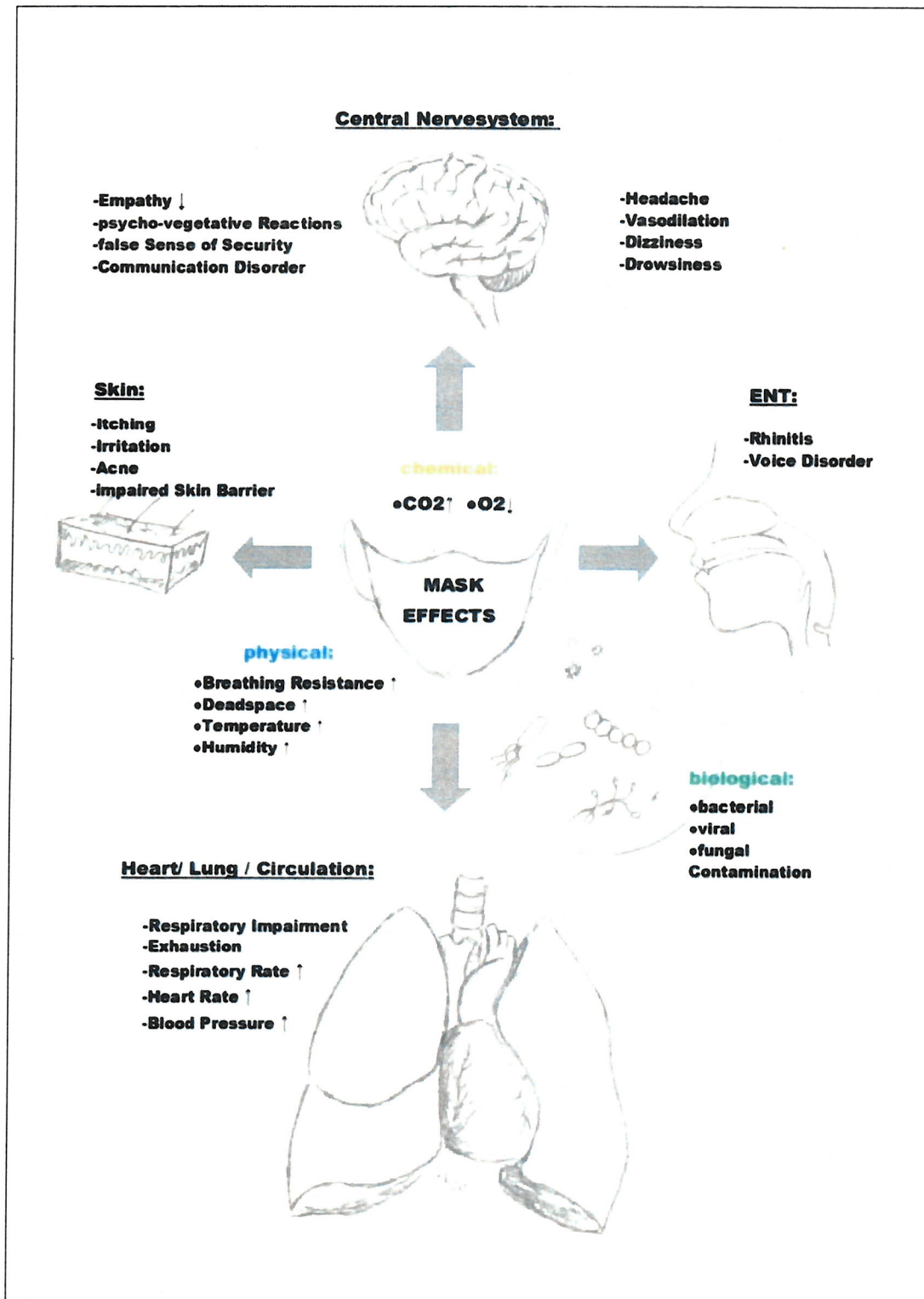


Figure 4: "Unfavorable mask effects as component of Mask-Induced Exhaustion Syndrome (MIES). The chemical, physical and biological effects, as well as the organ system

consequences mentioned, are all documented with statistically significant results in the scientific literature found (Figure 2). The term drowsiness is used here to summarize any qualitative neurological deficits described in the examined scientific literature.”³⁹

Increased risk of adverse effects when using masks:		
<u>Internal diseases</u> COPD Sleep Apnea Syndrome advanced renal Failure Obesity Cardiopulmonary Dysfunction Asthma	<u>Psychiatric illness</u> Claustrophobia Panic Disorder Personality Disorders Dementia Schizophrenia helpless Patients fixed and sedated Patients	<u>Neurological Diseases</u> Migraines and Headache Sufferers Patients with intracranial Masses Epilepsy
<u>Pediatric Diseases</u> Asthma Respiratory diseases Cardiopulmonary Diseases Neuromuscular Diseases Epilepsy	<u>ENT Diseases</u> Vocal Cord Disorders Rhinitis and obstructive Diseases	<u>Occupational Health Restrictions</u> moderate / heavy physical Work
	<u>Dermatological Diseases</u> Acne Atopic	<u>Gynecological restrictions</u> Pregnant Women

Figure 5: “Diseases/predispositions with significant risks, according to the literature found, when using masks. Indications for weighing up medical mask exemption certificates.”³⁹

Within minutes of wearing any of the three mask types, mask wearers exhibit a major frequency of typical, measurable, physiological changes secondary to the masks. These changes are partly due to increased rebreathing of CO₂ due to increased dead space (about double with a mask) and due to increased breathing resistance.^{67, 68} In addition, the gas content of oxygen is reduced about 14% from 20.9% in room air at sea level to 18.3%.⁶⁹ Consequently, there is a significant drop in blood O₂ saturation, an increased heart rate and an increased respiratory or

⁶⁷ Roberge, Raymond J., Jung-Hyun Kim, and Stacey M. Benson. “Absence of Consequential Changes in Physiological, Thermal and Subjective Responses from Wearing a Surgical Mask.” *Respiratory Physiology & Neurobiology* 181, no. 1 (April 15, 2012): 29–35. <https://doi.org/10.1016/j.resp.2012.01.010>.

⁶⁸ ROBERGE, Raymond J., Aitor COCA, W. Jon WILLIAMS, Andrew J. PALMIERO, and Jeffrey B. POWELL. “Surgical Mask Placement over N95 Filtering Facepiece Respirators: Physiological Effects on Healthcare Workers.” *Respirology* 15, no. 3 (May 2010): 569–77. <https://doi.org/10.1111/j.1440-1843.2010.01713.x>.

⁶⁹ Pifarré, Fernando, Diego Dulanto Zabala, Gonzalo Grazioli, and Ignasi de Maura. “COVID-19 and Mask in Sports.” *Apunts Sports Medicine* 55, no. 208 (December 2020): 143–45. <https://doi.org/10.1016/j.apunsm.2020.06.002>.

breathing rate.^{70, 71} A mask intervention study in 53 employed neurosurgeons wearing surgical masks demonstrated a decrease in O₂ saturation and an increased heart rate, even worse in the second hour than the first.³⁸ I mention this as I have worked in the operating room with surgeons and typically they say they notice no difference with a mask.⁷² However, the objective data shows otherwise. Please remember masks are worn by all workers in a Canadian operating room, but primarily to reduce secretions or spittle contacting an open wound. These masks do nothing for minimizing viral spread. In addition in hospital the recommendation is to change masks every hour or so. This is hardly ever done in a place of business or in schools. A wet mask is much worse than any mask or no mask.

The documented surgical mask-induced changes in blood gases of increased CO₂ (hypercapnia) and decreased O₂ (hypoxia) may result in mental confusion, decreased thinking ability and disorientation.^{73, 74, 75, 76} Masks also interfere with the field of vision and non-verbal

⁷⁰ Georgi, Christian, Anja Haase-Fielitz, Daniel Meretz, Linda Gäsert, and Christian Butter. "The Impact of Commonly-Worn Face Masks on Physiological Parameters and on Discomfort During Standard Work-Related Physical Effort." *Deutsches Aerzteblatt Online* 117 (2020): 674–75. <https://doi.org/10.3238/arztebl.2020.0674>.

⁷¹ Kyung, Sun Young, Yujin Kim, Hyunjoong Hwang, Jeong-Woong Park, and Sung Hwan Jeong. "Risks of N95 Face Mask Use in Subjects With COPD." *Respiratory Care* 65, no. 5 (May 2020): 658–64. <https://doi.org/10.4187/respcare.06713>.

⁷² Beder, A., Ü. Büyükköçak, H. Sabuncuoğlu, Z.A. Keskil, and S. Keskil. "Preliminary Report on Surgical Mask Induced Deoxygenation during Major Surgery." *Neurocirugía* 19, no. 2 (April 2008): 121–26. [https://doi.org/10.1016/s1130-1473\(08\)70235-5](https://doi.org/10.1016/s1130-1473(08)70235-5).

⁷³ Johnson, Arthur T. "Respirator Masks Protect Health but Impact Performance: a Review." *Journal of Biological Engineering* 10, no. 4 (February 9, 2016). <https://doi.org/10.1186/s13036-016-0025-4>.

⁷⁴ Elisheva, Rosner. "Adverse Effects of Prolonged Mask Use among Healthcare Professionals during COVID-19." *Journal of Infectious Diseases and Epidemiology* 6, no. 3 (June 1, 2020). <https://doi.org/10.23937/2474-3658/1510130>.

⁷⁵ Azuma, Kenichi, Naoki Kagi, U. Yanagi, and Haruki Osawa. "Effects of Low-Level Inhalation Exposure to Carbon Dioxide in Indoor Environments: A Short Review on Human Health and Psychomotor Performance." *Environment International* 121 (December 2018): 51–56. <https://doi.org/10.1016/j.envint.2018.08.059>.

⁷⁶ Drechsler, Michael, and Jason Morris. "Carbon Dioxide Narcosis." National Center for Biotechnology Information. U.S. National Library of Medicine, February 21, 2021. <https://pubmed.ncbi.nlm.nih.gov/31869084/>.

and verbal communication.^{77, 78, 79, 80, 81} Do we want our children in schools or pre-school to wear masks when there are relatively no benefits, but numerous risks and harmful consequences?

The mask-induced adverse changes are relatively minor at first glance but repeated exposures over longer periods are also relevant. Consider retail store workers, health care workers, teachers and many others who are currently wearing masks for 6-12 hours a day for 5-6 days a week. This will aggravate and create additional high blood pressure, atherosclerosis, including heart disease, metabolic syndrome and neurological diseases. In neurologic concerns think of headaches, fainting, epilepsy and reduced cognitive function.

Chris Schaefer, a 27-year experienced expert in Occupational Health and Safety, from Edmonton, demonstrated in a report and accompanying video (which I have carefully read and watched) prepared at the request of Mr. Dominic Desjarlais, lawyer, the oxygen and carbon dioxide level changes from the wearing of several types of masks.⁸² In my opinion, this report is powerfully persuasive of the dangers of wearing masks, especially in any work or schooling environment where people are wearing masks for longer periods of time. We can see in the video that the changes in carbon dioxide occur within a minute and continue to climb to dangerous carbon dioxide levels which creates a real and present hazard for the health of anybody wearing a mask.

⁷⁷ Rebmann, Terri, Ruth Carrico, and Jing Wang. "Physiologic and Other Effects and Compliance with Long-Term Respirator Use among Medical Intensive Care Unit Nurses." *American Journal of Infection Control* 41, no. 12 (December 1, 2013): 1218–23. <https://doi.org/10.1016/j.ajic.2013.02.017>.

⁷⁸ Spitzer, Manfred. "Masked Education? The Benefits and Burdens of Wearing Face Masks in Schools during the Current Corona Pandemic." *Trends in Neuroscience and Education* 20 (September 2020): 100138. <https://doi.org/10.1016/j.tine.2020.100138>.

⁷⁹ Heider, Claudia A., Matías L. Álvarez, Eduardo Fuentes-López, Claudia A. González, Norma I. León, Daniela C. Verástegui, Pedro I. Badía, and Carla A. Napolitano. "Prevalence of Voice Disorders in Healthcare Workers in the Universal Masking COVID-19 Era." *The Laryngoscope* 131, no. 4 (October 2, 2020). <https://doi.org/10.1002/lary.29172>.

⁸⁰ Roberge, Raymond J, Jung-Hyun Kim, and Aitor Coca. "Protective Facemask Impact on Human Thermoregulation: An Overview." *The Annals of Occupational Hygiene* 56, no. 1 (January 2012): 102–12. <https://doi.org/10.1093/annhyg/mer069>.

⁸¹ Palmiero, Andrew J., Daniel Symons, Judge W. Morgan, and Ronald E. Shaffer. "Speech Intelligibility Assessment of Protective Facemasks and Air-Purifying Respirators." *Journal of Occupational and Environmental Hygiene* 13, no. 12 (June 30, 2016): 960–68. <https://doi.org/10.1080/15459624.2016.1200723>.

⁸² Report dated June 7, 2021 and accompanying video prepared by Chris Schaefer for Mr. Dominic Desjarlais.

Our body is exquisitely sensitive to this increased CO₂ as it quickly dissolves in the blood as carbonic acid. It is the sudden change in acidity (hydrogen ion increase) which triggers the next breath. If we are unable to achieve a good next breath, we rapidly experience “air hunger”. Soon, both anxiety and even panic occur. This is exactly why a cloth over the nose and mouth with water poured over it (water boarding) is a frightening experience and a very successful torture technique. The change in oxygenation is especially common in young children as they have a higher metabolic rate (and associated higher CO₂ production).

All cloth masks become wet in 30-60 minutes as we continuously breathe out water vapour. It is very easy to consider the consequence of panic and fear, especially in a young child. If we ignore this I suggest long term PTSD (Post Traumatic Stress Disorder) and anxiety disorders are inevitable. Hospital workers and personnel use masks but change them very often and are very aware of how to do this optimally through repetitive training. This does not happen in the public and often will not happen in children. This is another important reason against a mask mandate in children.

The ultimate crisis from face masks is sudden death, which has been seen in five children worldwide when exercising or stressed with a mask.^{83, 84, 85, 86, 87, 88}

⁸³ Karvounides, Dina, Maya Marzouk, Alexandra C. Ross, Juliana H. VanderPluym, Christina Pettet, Ali Ladak, Jason Ziplow, et al. “The Intersection of COVID-19, School, and Headaches: Problems and Solutions.” *Headache: The Journal of Head and Face Pain* 61, no. 1 (December 31, 2020): 190–201. <https://doi.org/10.1111/head.14038>.

⁸⁴ Schwarz, Silke, Ekkehart Jenetzky, Hanno Krafft, Tobias Maurer, and David Martin. “Corona Children Studies ‘Co-Ki’: First Results of a Germany-Wide Registry on Mouth and Nose Covering (Mask) in Children.” April 28, 2021. <https://doi.org/10.21203/rs.3.rs-124394/v2>.

⁸⁵ “Tragisch: Starb Schülerin in Deutschland Wegen Masken-Pflicht?” *Wochenblick*, September 8, 2020. <https://www.wochenblick.at/tragisch-starb-schuelerin-in-deutschland-wegen-masken-pflicht/>.

⁸⁶ Salo, Jackie. “Two Boys Drop Dead in China While Wearing Masks during Gym Class.” *New York Post*. *New York Post*, May 6, 2020. <https://nypost.com/2020/05/06/two-boys-drop-dead-in-china-while-wearing-masks-during-gym-class/>.

⁸⁷ The Jakarta Post. “Youth Deaths in China during Gym Exams Put Focus on Mask Policy.” *The Jakarta Post*, May 11, 2020. <https://www.thejakartapost.com/news/2020/05/11/youth-deaths-in-china-during-gym-exams-put-focus-on-mask-policy.html>.

⁸⁸ Pifarré, Fernando, Diego Dulanto Zabala, Gonzalo Grazioli, and Ignasi de Maura. “COVID-19 and Mask in Sports.” *Apunts Sports Medicine* 55, no. 208 (December 2020): 143–45. <https://doi.org/10.1016/j.apunsm.2020.06.002>.

The following is a direct quote from myself in the second “Canadian Doctors Speak Out to Protect Kids” video⁸⁹:

“As a physician with over 40 years of experience, including decades as an anesthesiologist, I have cared for newborns, children and adults. I am a parent and a grandparent, so I too, have “skin in the game”.

As an anesthesiologist, I am acutely aware of the short-term harm that masks can cause. In a few minutes, air inside the mask decreases in oxygen by 15% (similar to being at high altitude). This alone triggers cognitive or thinking problems, headaches, drowsiness and fainting, and can even lead to developmental harm in kids’ brains.

In addition, all masks trap the carbon dioxide we breathe out. It goes to 7-10 times the suggested NIOSH / OSHA guidelines for a work environment within minutes. This is most dramatic in children, as they have a higher metabolic rate. This is even more dramatic in an exercising or anxious or frightened child. Higher carbon dioxide blood levels result in an increased risk of sudden cardiac arrhythmia. Why? Because high carbon dioxide increases the irritability of the heart electrical cycle, it can cause ventricular fibrillation, and even death. There are 5 world-wide deaths of children related to wearing masks with exercise or stress. This is madness.

Carbon dioxide controls our breathing and signals to our body to take the next breath. To experience this, close your mouth, hold your nose and hold your breath. Quite soon, you will gasp for another breath. We call this “air hunger” and is a huge protective mechanism of our well-being. Children who experience this “air hunger” are often told by adults to ignore it and leave the mask on. Why are we exposing our young children to this risk?

I suggest that children under 14 should never wear a mask and that no one of any age should wear a mask while exercising. In Sweden, children younger than 14 years old

⁸⁹ “Canadian Doctors Speak Out to Protect Kids.” Canada Health Alliance. Canada Health Alliance, May 2021. https://www.canadahealthalliance.org/?fbclid=IwAR34cR0vyNDXEKEofQOCGiBFij1KIFxBGSXlebEiXgi2JbcZNdaxm_sc1sM.

do not wear masks, and it was reported that the teachers were the healthiest professionals of all.

In summary, face masks are a “false god”, and should be voluntary only when you are sick and cannot stay home. Masks create much more harm than good.”

Table 1
Physiological and Psychological Effects of Wearing Facemask and Their Potential Health Consequences.

Physiological Effects	Psychological Effect	Health Consequences
<ul style="list-style-type: none"> ● Hypoxemia ● Hypercapnia ● Shortness of breath ● Increase lactate concentration ● Decline in pH levels ● Acidosis ● Toxicity ● Inflammation ● Self-contamination ● Increase in stress hormones level (adrenaline, noradrenaline and cortisol) ● Increased muscle tension ● Immunosuppression 	<ul style="list-style-type: none"> ● Activation of “fight or flight” stress response ● Chronic stress condition ● Fear ● Mood disturbances ● Insomnia ● Fatigue ● Compromised cognitive performance 	<ul style="list-style-type: none"> ● Increased predisposition for viral and infection illnesses ● Headaches ● Anxiety ● Depression ● Hypertension ● Cardiovascular disease ● Cancer ● Diabetes ● Alzheimer disease ● Exacerbation of existing conditions and diseases ● Accelerated aging process ● Health deterioration ● Premature mortality

Table 2: Physiological and Psychological Effects of Wearing Facemask and Their Potential Health Consequences³⁸

The use of cloth masks is especially dangerous for all items in Table 2 from Vainshelboim 2020. Furthermore, an RCT (Randomized Control Trial) over four weeks compared cloth face masks, medical masks and no masks on the incidence of clinical respiratory illness, influenza-like illness, and laboratory confirmed respiratory virus illness among 1,607 participants.⁹⁰ There was no difference found. However, a large harmful effect with more than **thirteen times higher**

⁹⁰ MacIntyre, C. R., H. Seale, T. C. Dung, N. T. Hien, P. T. Nga, A. A. Chughtai, B. Rahman, D. E. Dwyer, and Q. Wang. “A Cluster Randomised Trial of Cloth Masks Compared with Medical Masks in Healthcare Workers.” *BMJ Open* 5, no. 4 (2015). <https://doi.org/10.1136/bmjopen-2014-006577>.

risk for influenza-like illness was found in wearers of cloth masks. This study concluded that cloth masks have significant health and safety issues.

4. Psychological effects of face masks

Wearing a face mask has negative psychological effects on both the wearer and nearby persons. Basic interpersonal connections through facial expression are much reduced.^{91, 92, 93} Social connections and relationships are basic human needs. If these are insufficiently met, both poor mental and physical health result.^{94, 95}

Wearing masks entails a feeling of deprivation of freedom and loss of autonomy and self-determination. This can lead to suppressed anger and subconscious constant distraction, especially as the wearing of masks is mostly dictated and ordered by others.^{96, 97} Masks frequently cause anxiety and psychological vegetative stress reactions in children and adults. This increases psychosomatic and stress-related illnesses and depressive self-experience, reduced participation, social withdrawal and lowered health-related self-care.⁹⁸ The same paper shows over 50% of the mask wearers studied had at least mild depressive feelings.

⁹¹ Schneiderman, Neil, Gail Ironson, and Scott D. Siegel. "Stress and Health: Psychological, Behavioral, and Biological Determinants." *Annual Review of Clinical Psychology* 1, no. 1 (2005): 607–28. <https://doi.org/10.1146/annurev.clinpsy.1.102803.144141>.

⁹² Thoits, Peggy A. "Stress and Health: Major Findings and Policy Implications." *Journal of Health and Social Behavior* 51, no. 1_suppl (2010). <https://doi.org/10.1177/0022146510383499>.

⁹³ Haslam, Nick. "Dehumanization: An Integrative Review." *Personality and Social Psychology Review* 10, no. 3 (2006): 252–64. https://doi.org/10.1207/s15327957pspr1003_4.

⁹⁴ Cohen, Sheldon. "Social Relationships and Health." *American Psychologist* 59, no. 8 (2004): 676–84. <https://doi.org/10.1037/0003-066x.59.8.676>.

⁹⁵ Leigh-Hunt, N., D. Bagguley, K. Bash, V. Turner, S. Turnbull, N. Valtorta, and W. Caan. "An Overview of Systematic Reviews on the Public Health Consequences of Social Isolation and Loneliness." *Public Health* 152 (2017): 157–71. <https://doi.org/10.1016/j.puhe.2017.07.035>.

⁹⁶ Rains, Stephen A. "The Nature of Psychological Reactance Revisited: A Meta-Analytic Review." *Human Communication Research* 39, no. 1 (January 1, 2013): 47–73. <https://doi.org/10.1111/j.1468-2958.2012.01443.x>. <https://www.medrxiv.org/content/10.1101/2020.04.26.20080911v2>.

⁹⁷ Matusiak, Łukasz, Marta Szepietowska, Piotr Krajewski, Rafał Białynicki-Birula, and Jacek C. Szepietowski. "Inconveniences Due to the Use of Face Masks during the COVID-19 Pandemic: A Survey Study of 876 Young People." *Dermatologic Therapy* 33, no. 4 (August 28, 2020). <https://doi.org/10.1111/dth.13567>.

⁹⁸ Prousa, Daniela. "Studie Zu Psychischen Und Psychovegetativen Beschwerden Mit Den Aktuellen Mund-Nasenschutz-Verordnungen." *PsychArchives*. PsychArchives, January 2020. <https://www.psycharchives.org/handle/20.500.12034/2751>.

In addition, the mask has been transferred into a symbol of conformity and pseudo-solidarity. This increases the stress in those not wearing mask for a valid medical reason, which further divides and isolates people.

Further evidence of the importance of high or significant social connection was demonstrated in a meta-analysis of 91 studies of about 400,000 people. Folks with low contact frequency showed a 13% increased mortality risk.⁹⁹ Another meta-analysis of 148 prospective studies (308,849 participants) found that poor social relationships were associated with a 50% increased mortality risk. This increased mortality risk was comparable to smoking and exceeded both obesity and inactivity as risk factors.¹⁰⁰ These findings were consistent across ages, sex, initial health status, cause of death and follow-up periods. In short, this is extremely important to all of us. A further umbrella review of 10 meta-analyses showed increased risk of all-cause mortality, depression, anxiety, suicide, cancer and overall physical illness.⁹⁹

From another perspective, please appreciate the changes in physiology due to facemasks that trigger our stress response – think adrenalin, cortisol and other stress hormones. The repeated, or stress-fear response over many hours, triggers the body to react in survival or “fight and flight” mode. This causes sustained increases in blood pressure, excess inflammation and suppression of the immune system.^{67, 68} This of course, interferes with the body’s ability to cope with a viral infection such as SARS-CoV-2.

VIII. Conclusions

In the foregoing, I have outlined the following key points:

1. The real nature and risks of COVID-19: it does not constitute a serious threat, whether real or imminent, for the greater majority of the population.
2. The optimal assessment of the quality of scientific or medical evidence regarding masks.

⁹⁹ Shor, Eran, and David J. Roelfs. “Social Contact Frequency and All-Cause Mortality: A Meta-Analysis and Meta-Regression.” *Social Science & Medicine* 128 (2015): 76–86. <https://doi.org/10.1016/j.socscimed.2015.01.010>.

¹⁰⁰ Holt-Lunstad, Julianne, Timothy B. Smith, and J. Bradley Layton. “Social Relationships and Mortality Risk: A Meta-Analytic Review.” *PLoS Medicine* 7, no. 7 (2010). <https://doi.org/10.1371/journal.pmed.1000316>.

3. That the evidence in favour of the wearing of masks is only observational and there are no Random Controlled Trials (RCTs) and therefore, no Meta-analyses thereof, whereas the evidence against the wearing of masks is substantial and is based on RCTs and meta-analyses.
4. That the problems with masks are confirmed in a series of RCTs.
5. Mask problems reveal:
 - i) No masks (surgical, N-95 or cloth) prevent virus transmission. In fact, they probably increase risk to the wearer and the people around them.
 - ii) Within minutes, the mask wearer's carbon dioxide climbs to quite unhealthy levels, and oxygen levels decrease, also with health consequences.
 - iii) Masks create headaches and cognitive impairment.
 - iv) Anxiety and stress are triggered by wearing masks, especially in children.
6. In my opinion, in over 40 years as a physician, and decades as an anesthesiologist, when one considers the risk-benefit ratio for masks:
 - i) The risk of major illness or death in children due to COVID-19 is almost zero.
 - ii) Masks are not effective in preventing COVID-19 transmission and may worsen the transmission.
 - iii) Masks elevate carbon dioxide and lower oxygen blood concentrations within minutes. This reduces cognitive capability, interferes with learning, increases anxiety and may even cause arrhythmias and even sudden death.

Therefore, in my opinion, as a result of studying the scientific literature and in view of my professional experience, masks create much more harm than benefit, especially in children. Hence, any mask mandate should be immediately rescinded.

William E Code

A handwritten signature in black ink, appearing to read "W E Code". The signature is written in a cursive style with some loops and flourishes.

Signed June 10, 2021, Duncan, BC, Canada