

Princeton, NJ 08540
December 1, 2020

Dr. Edward Lifshitz, Medical Director
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Department of Health
P. O. Box 360
Trenton, NJ 08625-0360

Dr. Lifshitz,

This open letter is in response to your [Covid-19 briefing on 2020-11-30](#). At the briefing, Governor Murphy stated “We enforce restrictions on the activities that have proven to have the greatest risk of transmission.” Subsequently he announced that all indoor youth sports would be suspended from 12/05/20 to 01/02/21. You reported “20 outbreaks and more than 100 cases tied to youth hockey”, but did not cite any Covid-19 transmission events for other youth sports.

Before allowing our own children to return to competitive swimming indoors, we conducted a systematic search of the PubMed database of published biomedical literature as well as of the bioRxiv and medRxiv preprint databases. We found ample evidence of SARS-CoV-2 transmission in indoor ice hockey¹, indoor exercise classes², indoor dance classes³, and vigorous indoor choir practice⁴. *However, we, like our fellow scientists at the CDC, were unable to find any evidence of Covid-19 transmission in swim practices, swim meets, or indeed in any public pool setting, either indoors or outdoors.*

“CDC is not aware of any scientific reports of the virus that causes COVID-19 spreading to people through the water in pools, hot tubs, or water playgrounds.”⁵

¹ Atrubin D, Wiese M, Bohinc B. An Outbreak of COVID-19 Associated with a Recreational Hockey Game — Florida, June 2020. MMWR Morb Mortal Wkly Rep 2020;69:1492–1493. DOI:

<http://dx.doi.org/10.15585/mmwr.mm6941a4>

² Taekema, D. & Hristova, B. (2020) Woman who contracted COVID-19 at Spinco Hamilton says the virus has been 'horrendous', CBC News,

<https://www.cbc.ca/news/canada/hamilton/spinco-member-shocked-covid-19-1.5763114>

³ Jang, S., Han, S., & Rhee, J. (2020). Cluster of Coronavirus Disease Associated with Fitness Dance Classes, South Korea. Emerging Infectious Diseases, 26(8), 1917-1920.

<https://dx.doi.org/10.3201/eid2608.200633>.

⁴ Miller SL, Nazaroff WW, Jimenez JL, Boerstra A, Buonanno G, Dancer SJ, Kurnitski J, Marr LC, Morawska L, Noakes C. Transmission of SARS-CoV-2 by inhalation of respiratory aerosol in the Skagit Valley Chorale superspreading event. Indoor Air. 2020 Sep 26:10.1111/ina.12751. doi: 10.1111/ina.12751. <https://pubmed.ncbi.nlm.nih.gov/32979298/>

⁵ <https://www.cdc.gov/coronavirus/2019-ncov/faq.html#Pools,-Hot-Tubs,-and-Water-Playgrounds>

To the contrary, our systematic literature review identified clear evidence of the effectiveness of pool chlorine in killing viruses, including coronaviruses⁶⁷, and of the role of high indoor pool relative humidity in reducing airborne viral transmission⁸. Please provide references if you have evidence to the contrary.

We further learned that youth swimming appears ideally suited to curb SARS-CoV-2 transmission, including:

1. Our athletes do not use locker rooms - they arrive and depart in their swimsuits.
2. Our athletes maintain a 6 foot separation while practicing and competing.
3. Our athletes exhale underwater, which provides source control while exercising.
4. The pool water/air is chlorinated, which is proven to deactivate coronaviruses.⁹
5. The pool air is humid, which is known to reduce airborne viral transmission¹⁰.
6. The indoor pool air is warmed by the heated pool water, which increases ventilation in the fall and winter, when the outside air is colder than the indoor pool air.
7. Indoor pools are designed with high ceilings, a large volume of indoor air, and high-capacity HVAC to safely disperse chlorine vapors.

Our swim team is fortunate to practice in a facility whose HVAC system can completely replace the vast 15 lane pool area with fresh air in only 5 minutes. It uses MERV-13 filters and can maintain relative humidity above 40% and CO2 below 500 ppm at full occupancy satisfying the strictest ASHRAE guidelines¹¹ Indeed, **a modern recreational swimming pool is arguably the safest place to be indoors, far safer than any office, home, school, store, restaurant, gymnasium, or ice rink.**

⁶ La Rosa, G., Bonadonna, L., Lucentini, L., Kenmoe, S., & Suffredini, E. (2020). Coronavirus in water environments: Occurrence, persistence and concentration methods - A scoping review. *Water research*, 179, 115899. <https://doi.org/10.1016/j.watres.2020.115899>

⁷ García-Ávila, F., Valdiviezo-Gonzales, L., Cadme-Galabay, M., Gutiérrez-Ortega, H., Altamirano-Cárdenas, L., Zhindón- Arévalo, C., & Flores del Pino, L. (2020) Considerations on water quality and the use of chlorine in times of SARS-CoV-2 (COVID-19) pandemic in the community. *Case Studies in Chemical and Environmental Engineering*, <https://doi.org/10.1016/j.cscee.2020.100049>.

⁸ Ahlawat, A., Wiedensohler, A. & Mishra, S.K. (2020). An Overview on the Role of Relative Humidity in Airborne Transmission of SARS-CoV-2 in Indoor Environments. *Aerosol Air Qual. Res.* 20: 1856–1861. <https://doi.org/10.4209/aaqr.2020.06.0302>

⁹ The CDC states “The proper operation of public pools .. and disinfection of the water (with chlorine or bromine) should inactivate the virus.”

¹⁰ Marr, L. C., Tang, J. W., Van Mullekom, J., & Lakdawala, S. S. (2019). Mechanistic insights into the effect of humidity on airborne influenza virus survival, transmission and incidence. *Journal of the Royal Society, Interface*, 16(150), 20180298. <https://doi.org/10.1098/rsif.2018.0298>

¹¹ ASHRAE Position Document on Infectious Aerosols, 2020-04-14; ASHRAE Reopening Guide for Schools and Universities, 2020-07-22. <https://www.ashrae.org/technical-resources/resources>

Note that the risks of indoor swimming are the inverse of indoor ice hockey, where locker room use is routine, athlete contact is common, no source control or distancing for athletes occurs while practicing or competing, low relative humidity promotes virus aerosolization, facilities typically have limited HVAC systems, and ventilation is impeded during the summer and fall by the air being colder inside than outside. Banning a demonstrably safe activity, such as competitive swimming, because of Covid-19 transmission in a known unsafe activity, such as indoor ice hockey, is not justified by either data or science.

In conclusion, we found ample supporting evidence for the safety of indoor swimming and none to the contrary. As scientists, we are obliged to rationally conclude that youth competitive swimming can be conducted safely indoors. As a public health official, and fellow scientist, we believe you have an affirmative duty to advise Governor Murphy that there is no evidence of Covid-19 transmission in youth competitive swimming. Neither the data nor the science justifies suspending youth indoor swimming. Indeed, the evidence strongly suggests that youth competitive swimming is one of the safest indoor activities full stop and therefore should not be subject to the same stringent restrictions that are applied to indoor activities with well-documented transmission events, such as indoor ice hockey and chorus practice.

Sincerely,

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Cc: The Honorable Governor Murphy

Ref: <https://tinyurl.com/ScientistsDisputeLockdown>

Join Letter: <https://forms.gle/R44QDJYMCnh7vcCH8>