LIST OF ARTICLES TO ACCOMPANY NATS WEBINAR – Thursday, May 5, 2020, 5-7pm

"A Conversation: What Do Science and Data Say About the Near-Term Future of Singing"

compiled by Deanna McBroom, MM

This is a representative list of articles and sources intended to provide easy access to fact-based research resources in order to consider the effect of Covid19 on singing training and performance. While by no means an exhaustive literature review on topics related to Covid19 and singing, it comes from many disciplines that have bearing on the singing task in a variety of environments and rooms, styles and genres, both as a solo singer and in groups, both amateurs and professionals. Included are articles and guidelines from the worlds of the sport athlete, the wind instrumentalist, and the dancer, who are affected by similar behavioral, performance, and lifestyle issues. Several citations come from colleagues who represent organizations in Athletes and the Arts. NATS is a member of this consortium of arts and sport organizations; its purpose is to share and benefit from each other's expertise and fact-based research, and to collaborate and advocate for the health and welfare of all artists and sport athletes.

Deanna McBroom, MM – Compiler
NATS Representative to Athletes and the Arts & Performing Arts Medicine Association
Singing Voice Specialist-Medical University of SC
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Articles about Singing and Covid19

1. The Guardian, 5/4/20 - "Germany to set out rules for religious services including singing ban"

"Germany is to set out guidelines for holding religious services during the coronavirus pandemic with a list of strict restrictions expected to include a ban on singing."

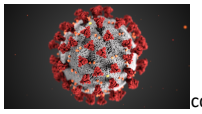
https://www.theguardian.com/world/2020/apr/29/germany-to-set-out-rules-for-religious-services-including-singing-ban

2. Article on "Virtual Choirs" from National Association for Music Education online blog

https://nafme.org/virtual-choirs/

3. A Washington state choir decided to go ahead with rehearsal. Now dozens of members have COVID-19 and two are dead The deadly outbreak among members of a choir has stunned health officials, who have concluded that the virus was almost certainly transmitted through the air from one or more people without symptoms.

https://www.latimes.com/world-nation/story/2020-03-29/coronavirus-choir-outbreak



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Aerosolization of Viral Infection Disease Particles

1. New York Times 4/14/20, "This 3-D Simulation Shows Why Social Distancing Is So Important" by Yuliya Parshina-Kottas, Bedel Saet, Karthik Patanjali, Or Fleisher and Gabriel Gianordoli. April 14, 2020

This simulation, using research data from Kyoto Institute of Technology, offers one view of someone coughing indoors. A cough produces respiratory droplets of varying sizes. Larger droplets fall to the floor, or break up into smaller droplets. Understanding the possible transmission routes for the virus can help us see why keeping our distance is so important.

https://www.nytimes.com/interactive/2020/04/14/science/coronavirus-transmission-cough-6-feet-ar-ul.html?fbclid=IwAR1XH-ZAGkskryC2MbiaDsLbbroqJhrlh6I8bj14S16292uMLqTK6ZMDMKM

2. Journal of Aerosol Science, Author(s): Morawska, Lidia, et al. Mar 2009

"Average particle number concentrations produced during exhalation increased in activities from normal breathing to speech to sustained vocalization." [One can infer that singing may produce an additional increase in particle concentration.]

https://www.researchgate.net/publication/222567351_Size_distribution_and_sites_of_origin_of_droplets_expelled_from_the_human_respiratory_tract_during_expiratory_activities

3. Proceedings of the National Academy of Sciences of the USA.

"Infectious virus in exhaled breath of symptomatic seasonal influenza cases from a college community"

Jing Yan, Michael Grantham, Jovan Pantelic, P. Jacob Bueno de Mesquita, Barbara Albert, Fengjie Liu, Sheryl Ehrman, View ORCID Profile Donald K. Milton, and EMIT Consortium PNAS January 30, 2018 115 (5) 1081-1086; first published January 18, 2018 https://doi.org/10.1073/pnas.1716561115, Edited by Peter Palese, Icahn School of Medicine at Mount Sinai, New York, NY, and approved December 15, 2017

Influenza virus is exhaled in breath droplets in varying concentrations from normal breathing to speech, to cough.

https://www.pnas.org/content/115/5/1081

4. Roy, Chad J, Milton, Donald K. Airborne Transmission of Communicable Infection — The Elusive Pathway. New England Journal of Medicine 350:1710 - 1712, 2004.

". . . As with the demonstration of the airborne transmission of tuberculosis, airborne transmission from the average case of SARS is not easily proved, but it should also not be dismissed out of hand. . . . But substantial transmission from patients with unsuspected cases, especially in waiting rooms, can be expected and was observed during the SARS epidemic. . . . As perplexing as it may be, the peculiarity of the transmission of the SARS coronavirus . . . may be a harbinger of unorthodox transmission patterns associated with emerging infectious agents in the modern built environment. It is a clear demonstration of the need for a better understanding of aerosol-acquired disease — whether airborne transmission is obligate, preferential, or opportunistic — and for improved vigilance and infection control.

https://apps.dtic.mil/dtic/tr/fulltext/u2/a429398.pdf

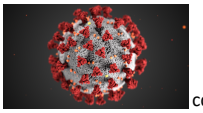
5. from online peer-reviewed publisher:)PLoS ONE 15(1): e0227699. https://doi.org/10.1371/journal.pone.0227699, Jan. 27, 2020.

"Effect of voicing and articulation manner on aerosol particle emission during human speech"

Sima Asadi, Anthony S. Wexler, Christopher D. Cappa, Santiago Barreda, Nicole M. Bouvier, William D. Ristenpart

In summary, we compared particle emission rates for different types of speech including individual vowels, monosyllabic words, and disyllabic words. Our results confirm that certain vowels such as /i/ and consonants such as /d/ have higher particle emission rates than others. Likewise, particle emission rates during phonetically different phrases in a passage of text [including the Rainbow Passage] showed higher emission rates for phrases with higher fraction of vowels and lower fractions of voiceless fricatives. We interpret our observations in terms of egressive airflow rate of different phones, which is known to vary significantly with voicing and articulation manner of each phone. Considering the different distribution of phones between different languages, the results presented here lend credence to the hypothesis that individual vocalization patterns, including language spoken, could be important epidemiological metrics, and as such merit closer attention."

https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0227699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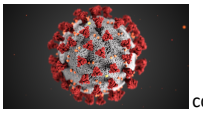
COVID19 Guidelines for Sport Athletes-from Steve Rock MD, physician/AATA representative-Drum Corps International

1. US Olympic Committee Guidelines for Return to Training and Return to Event Planning Considerations (updated 5/4/20)
https://www.teamusa.org/Coronavirus-Updates

2. NCAA's Sport Science Institute Guidelines: Core principles of Resocialization of Collegiate Sport
http://www.ncaa.org/sport-science-institute/core-principles-resocialization-collegiate-sport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Factual information on the Covid19 virus, testing, treatment and vaccination prospects – Bill and Melinda Gates Foundation

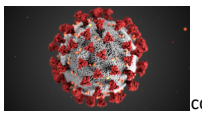
1. Bill Gates' blog: The First Modern Pandemic (24-min. read), The scientific advances we need to defeat COVID-19

This memo "helps people make sense of what is happening, understand the innovations we still need, and make informed decisions about dealing with the pandemic."

https://www.gatesnotes.com/Health/Pandemic-Innovation

2. Washington Post opinion page reprint on Bill Gates' website, condensed version of "The First Modern Pandemic" by Bill Gates

https://www.gatesnotes.com/Health/Innovation-for-COVID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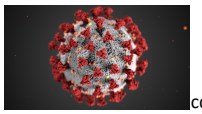
CDC/White House Guidelines

1. Centers for Disease Control and Prevention/White House guidelines for Covid19 released recently by the White House – Criteria, Preparedness, and Phase Guidelines
https://www.whitehouse.gov/openingamerica/
2. Covid19 Situation Summary – April 19, 2020. Facts, Background, Risk Assessment for Covid19
https://www.cdc.gov/coronavirus/2019-ncov/cases-updates/summary.html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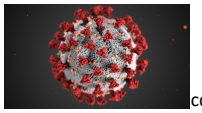
from Chicago sport psychologist Chelsea Wooding, PhD, AATA Representative-Association for Applied Sport Psychology

1. Dr. Kensa Gunter Shares Tips on Handling Life at Home During COVID-19 With DeMar Derozan via #NBATogetherLive
https://www.youtube.com/watch?v=KCJ8ZkbO7dU
2.Coronavirus and Youth Sports - the Aspen Institute and Project Play may have some other helpful resources.
https://www.aspenprojectplay.org/coronavirus-and-youth-sports
3 Dealing with Disappointment During Coronavirus Cancellations, Postponements
https://positivecoach.org/ask-pca/dealing-with-disappointment-during-coronavirus-cancellations-postponements/
4. Using the Sports Shutdown to Recover the Joy of Sports
https://positivecoach.org/the-pca-blog/using-the-sports-shutdown-to-recover-the-joy-of-sports/
5. How Student-Athletes Can Cope with the Consequences of the COVID-19 Pandemic
https://www.cypherpsych.com/blog/coronavirus
6. An Open Letter to Student-Athletes: Lessons I Learned from You Amidst a Crisis)
https://www.tristatesportpsych.com/post/2020/03/19/an-open-letter-to-student-athletes-lessons-i-have-learned-from-you-amidst-a-crisis
7. Unfinished Business: 5 Insights When Your Athletic Season Is Sidelined by a Pandemic
https://www.sidelinedusa.org/resources-blog/unfinished-business-5-insights-when-your-athletic-season-is-sidelined-by-a-pandemic
8. Finding Ways to Cope Feat. AASP Scientific Program-Elect Stephen Gonzalez
https://www.rowingnews.com/2020/04/03/finding-ways-to-cope/
9. Mindset Matters During COVID-19 Feat. AASP Web Presence Committee Chair Abby Keenan
https://www.thedistance.atlantatrackclub.org/from-the-experts/mindset-matters-during-covid-19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Use of Personal Protective Equipment, from Lucinda Halstead, MD, Laryngologist, Medical Univ. of SC, Charleston SC

1. Physiological Impact of the N95 Filtering Facepiece Respirator on Healthcare Workers
Raymond J Roberge MD MPH, Aitor Coca PhD, W Jon Williams PhD, Jeffrey B Powell MSc, and Andrew J Palmiero

This study assesses "the physiological impact of the N95 filtering facepiece respirator (FFR) on healthcare workers. . . . In healthy healthcare workers, FFR did not impose any important physiological burden during 1 hour of use, at realistic clinical work rates, but the FFR dead-space carbon dioxide and oxygen levels were significantly above and below, respectively, the ambient workplace standards, and elevated PCO2 is a possibility. Exhalation valve did not significantly ameliorate the FFR's PCO2 impact.
https://www.ncbi.nlm.nih.gov/pubmed/20420727