

VASTA COVID-19 Scenario Planning Guidelines

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Part I: Current Recommendations

Safest Possible Recommendation as of June, 2020:

It is the recommendation of VASTA that Voice, Speech, Dialect and Text classes be taught online until such time as a vaccine or cure for COVID-19 is developed that refutes the known dangers outlined in current scientific literature. Teaching online is the only way to avoid risk of exposure to the virus. Until such time as there is evidence of an effective and safe means to teach face-to-face, voice and speech trainers are advised to avoid face-to-face methods where possible, and to try to limit exposure in instances where it is unavoidable or required by administrations.

Risk factors to consider when exploring the possibility of face-to-face teaching include but are not limited to: ventilation, sanitizing the space between sessions, masking of students and teacher(s), appropriate number of participants in the space, increasing physical distancing, and regular hand washing, as well as medical breakthroughs that drastically reduce risk (vaccine/treatment). Please refer to Part II for a thorough overview of risk factors and considerations.

It is with great faith in the teaching/coaching ability and creativity of our membership that new and effective ways of delivering curriculum will be imagined and implemented at this time.

While moving to online instruction is recommended for teaching voice and speech at this time, we recognize that doing so can deepen issues of access and equity in performance training. We advocate that institutions and organizations take active steps to make online learning accessible and equitable for all students. As we update Part III of this document, we will include ways in which the voice and speech trainer can build and support an equitable atmosphere in their learning spaces.

This series of guidelines has been created as a living document and will continue to be updated as new data becomes available.

Part II: Risk Considerations for the Return to In-Person Voice and Speech Training

To make all factors below effective, there must be a collective agreement amongst students, faculty, staff, and administration to maintain clear regulations for safe instruction. Please refer to our appendix of resources to fully engage in a review of risk factors.

Throughout this chart you will find phrases with the words “clear and obligatory protocols.” We want to highlight the challenges of ensuring that students are following guidelines when it comes to set expectations such as mask wearing, social distancing, or remaining in small groups.

Subject	Factors which increase risk	Factors which reduce risk	Notes
Entrance Control	<ul style="list-style-type: none"> Commuter student populations: Public Transportation to class¹ Residential student populations: crossover between dorms, classes, and social² gatherings³ Narrow hallways and stairwells to and from classroom spaces⁴ Buildings which utilize elevators as a primary means of access⁵ 	<ul style="list-style-type: none"> Clear and obligatory entrance and exit protocols Staggered class transitions One-way trafficking of students around campus⁶ Temperature checks Symptom queries Regular testing and tracing* Clear and obligatory protocols for protective practices in shared spaces 	*rolling documentation on testing procedures and efficacy will be necessary

¹ <https://www.cdc.gov/coronavirus/2019-ncov/community/organizations/bus-transit-operator.html>

² <https://www.cdc.gov/coronavirus/2019-ncov/daily-life-coping/shared-housing/index.htm> |

³ <https://www.ncbi.nlm.nih.gov/books/NBK143281/>

⁴ <https://www.theatlantic.com/health/archive/2020/04/coronavirus-pandemic-airborne-go-outside-masks/609235/>

⁵ <https://www.nytimes.com/2020/06/07/business/coronavirus-offices-cdc-guidelines.html?>

⁶ <https://educatingthroughcrisis.org/meeting-students-and-families-needs/guidance-for-reopening-schools-covid/>

Learning Space	<ul style="list-style-type: none"> ● Poor ventilation or lack of ventilation⁷ ● HVAC systems which recycle air throughout the building^{8 9} ● Small spaces which do not accommodate social distancing¹⁰ ● Large groups of students¹¹ ● Long course periods creating greater exposure to aerosolized virus ● Shared instructional materials ● Turbulence or convection causing adverse air movement¹² 	<ul style="list-style-type: none"> ● Accommodations for at-risk groups ● Air turnover rate at 10-12 times per hour ● Ventilation of outside air into the building¹³ ● Maintaining humidity factors to decrease viral incubation¹⁴ ● Supplemental UV disinfection systems in heightened ceiling spaces¹⁵¹⁶ ● Heightened ceilings accompanied by proper ventilation for increase air turnover ● Clear and obligatory sanitization and disinfection protocols¹⁷ • Access to larger spaces, including outdoor spaces*, to accommodate social distancing¹⁸¹⁹ ● Assign instructional materials to individuals 	*must consider wind direction and quality
Personal Protection	<ul style="list-style-type: none"> ● Working in close proximity to potential carriers ● Working face-to-face with potential carriers ● Use of low quality/used masks and/or face shields have been found to be ineffective after prolonged 	<ul style="list-style-type: none"> ● Clear and obligatory social distancing protocols*²¹ 	*Note that 6 feet/2 meters is not sufficient for loud speaking or

⁷ <https://www.nytimes.com/2020/03/04/opinion/coronavirus-buildings.html>

⁸ <https://www.bbc.co.uk/news/science-environment-52522460>

⁹ <https://arxiv.org/abs/2003.13689>

¹⁰ <https://www.nytimes.com/interactive/2020/04/14/science/coronavirus-transmission-cough-6-feet-ar-ul.html>

¹¹ <https://www.nytimes.com/2020/06/15/opinion/coronavirus-college-safe.html>

¹² <https://www.ncbi.nlm.nih.gov/books/NBK143281/>

¹³ [Respiratory droplets - Natural Ventilation for Infection Control in Health-Care Settings](#)

¹⁴ [Opinion | Your Building Can Make You Sick or Keep You Well](#)

¹⁵ <https://bit.ly/2BrgPjW>

¹⁶ <https://bit.ly/2AdtUgi>

¹⁷ <https://www.cdc.gov/handwashing/when-how-handwashing.html>

¹⁸ <https://www.bbc.co.uk/news/science-environment-52522460>

¹⁹ <https://elemental.medium.com/will-your-soccer-club-ever-meet-again-a-guide-to-outdoor-sports-this-summer-49b2c2bdf477>

²¹ <https://www.nytimes.com/interactive/2020/04/14/science/coronavirus-transmission-cough-6-feet-ar-ul.html>

(Personal Protection continued)	<p>usage for reducing exposure²⁰</p> <ul style="list-style-type: none"> ● Inadequate access to sanitation 	<ul style="list-style-type: none"> ● Mandatory use of effective masks^{22 23} ● Clear and obligatory hand sanitizing protocols²⁴ ● Working side by side or back to back as opposed to face to face (in addition to social distancing) ● Daily testing ● Denying in-person participation in class to people testing positive for virus. 	<p>singing</p> <p>Unknown risk level: plexiglass partitions.</p>
Course Content	<ul style="list-style-type: none"> ● Increased physical exertion²⁵²⁶ ● Activities which include touching physical person, objects, or surfaces²⁷ ● Activities which disrupt social distancing protocols²⁸ ● Activities which include loud speaking²⁹ ● Working in close proximity to potential carriers ● Working face-to-face with potential carriers 	See Part III for planning strategies based on content	

²⁰

<https://bit.ly/3g33Q70>

²² <https://www.erinbromage.com/post/what-s-the-deal-with-masks>

²³ <https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/about-face-coverings.html>

²⁴ https://www.nytimes.com/2020/05/28/well/live/whats-the-risk-of-catching-coronavirus-from-a-surface.html?action=click&block=more_in_recirc&impression_id=957729580&index=2&pgtype=Article®ion=footer

²⁵ https://dance-usa.s3.amazonaws.com/page_uploads/COVID%20FAQ%20-%20MAY%202020.pdf

²⁶ <https://elemental.medium.com/will-your-soccer-club-ever-meet-again-a-guide-to-outdoor-sports-this-summer-49b2c2bdf477>

²⁷ https://www.nytimes.com/2020/05/28/well/live/whats-the-risk-of-catching-coronavirus-from-a-surface.html?action=click&block=more_in_recirc&impression_id=957729580&index=2&pgtype=Article®ion=footer

²⁸ <https://educatingthroughcrisis.org/meeting-students-and-families-needs/guidance-for-reopening-schools-covid/>

²⁹ <https://www.nature.com/articles/s41598-019-38808-z>

Appendix A: Research Documentation

Article	Author	Credentials/ Affiliations	Notes	Link
Identifying airborne transmission as the dominant route for the spread of COVID-19	Renyi Zhang, Yixin Li, Annie L. Zhang, Yuan Wang, and Mario J. Molina	Proceedings of the National Academy of Sciences of the United States of America	<p>"Our results show that the airborne transmission route is highly virulent and dominant for the spread of COVID-19."</p> <p>"Within an enclosed environment, virus-bearing aerosols from human atomization are readily accumulated, and elevated levels of airborne viruses facilitate transmission from person to person. Transmission of airborne viruses in open air is subject to dilution, although virus accumulation still occurs due to stagnation under polluted urban conditions"</p> <p>"the importance of airborne transmission has not been considered in establishment of mitigation measures by government authorities (1, 20). Specifically, while the WHO and the US Centers for Disease Control and Prevention (CDC) have emphasized the prevention of contact transmission, both WHO and CDC have largely ignored the importance of the airborne transmission route"</p>	https://bit.ly/2YkI9Ky
The Risks - Know Them - Avoid Them	Erin Bromage	Comparative Immunologist and Professor of Biology (specializing in Immunology) at the University of Massachusetts Dartmouth.	<p>"Indoor spaces, with limited air exchange or recycled air and lots of people, are concerning from a transmission standpoint."</p> <p>"Social distancing guidelines don't hold in indoor spaces where you spend a lot of time"</p> <p>"The principle is viral exposure over an extended period of time. In all these cases, people were exposed to the virus in the air for a prolonged period (hours). Even if they were 50 feet away (choir or call center), even a low dose of the virus in the air reaching them, over a sustained period, was enough to cause infection and in some cases, death. "</p>	https://bit.ly/3dh8NXT
What's the deal with Masks?	Erin Bromage	Comparative Immunologist and Professor of Biology (specializing in Immunology) at the University of Massachusetts Dartmouth.	<p>"Indoor spaces allow for the virus to accumulate in the air if there is not adequate air filtration and exchange."</p> <p>"In indoor environments with poor air exchange and filtration, the infected respiratory droplets can spread throughout the room, build up in the air, and, after a sufficient length of time, people sharing that space can inhale enough of a viral load to become infected. However, with mask use, the respiratory emissions are lowered, and you are provided with a greater period of time before reaching an infectious dose."</p> <p>A Cough: A single cough releases about 3,000 droplets and droplets travels at 50 miles per hour. Most droplets are large, and fall quickly (gravity), but many do stay in the air and can travel across a room in a few seconds.</p>	https://bit.ly/2NgGcrf

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Reducing transmission of SARS-CoV-2	Kimberly A. Prather, Chia C. Wang, Robert T. Schooley	<p>1Scripps Institution of Oceanography, University of California San Diego, La Jolla, CA 92037, USA.</p> <p>2Department of Chemistry, National Sun Yat-sen University, Kaohsiung, Taiwan 804, Republic of China.</p> <p>3Aerosol Science Research Center, National Sun Yat-Sen University, Kaohsiung, Taiwan 804, Republic of China.</p> <p>4Department of Medicine, Division of Infectious Diseases and Global Public Health, School of Medicine, University of California San Diego, La Jolla, CA 92093, USA.</p>	<p>"The U.S. Centers for Disease Control and Prevention (CDC) recommendations for social distancing of 6 ft and hand washing to reduce the spread of SARS-CoV-2 are based on studies of respiratory droplets carried out in the 1930s."</p> <p>"SARS-CoV-2 may also be transmitted through aerosols."</p> <p>"Increasing evidence for SARS-CoV-2 suggests the 6 ft CDC recommendation is likely not enough under many indoor conditions where aerosols can remain airborne for hours, accumulate over time, and follow air flows over distances further than 6 ft"</p> <p>"The distance from a smoker at which one smells cigarette smoke indicates the distance in those surroundings at which one could inhale infectious aerosols. In an enclosed room with asymptomatic individuals, infectious aerosol concentrations can increase over time. Overall, the probability of becoming infected indoors will depend on the total amount of SARS-CoV-2 inhaled. Ultimately, the amount of ventilation, number of people, how long one visits an indoor facility, and activities that affect air flow will all modulate viral transmission pathways and exposure"</p>	https://bit.ly/37P5eHn
How COVID-19 Spreads	Centers for Disease Control and Prevention	CDC	"The virus is thought to spread mainly from person-to-person through respiratory droplets produced when an infected person coughs, sneezes, or talks."	https://bit.ly/2Bw8H1i

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Estimation of airborne viral emission: Quanta emission rate of SARS-CoV-2 for infection risk assessment	G.Buonanno(ab) L.Stabile(a) L.Morawsk(ab)	a: Department of Civil and Mechanical Engineering, University of Cassino and Southern Lazio, Cassino, FR, Italy b: International Laboratory for Air Quality and Health, Queensland University of Technology, Brisbane, Qld, Australia	"...high quanta emission rates (>100 quanta h ⁻¹) can be reached by an asymptomatic infectious SARS-CoV-2 subject performing vocalization during light activities (i.e. walking slowly) whereas a symptomatic SARS-CoV-2 subject in resting conditions mostly has a low quanta emission rate (<1 quantum h ⁻¹)." "a key role is played by proper ventilation in containment of the virus in indoor environments."	https://bit.ly/2YIP6u0
The coronavirus pandemic and aerosols: Does COVID-19 transmit via expiratory particles?	Sima Asadi (a), Nicole Bouvier (b), Anthony S. Wexler (c), and William D. Ristenpart (a)	aDepartment of Chemical Engineering, Davis College of Engineering, University of California, Davis, California, USA; bDepartments of Medicine and Microbiology, Icahn School of Medicine at Mount Sinai, New York, New York, USA; cMechanical and Aeronautical Engineering, University of California—Davis, Davis, California, USA	"speech plausibly serves as an important and under-recognized transmission mechanism for COVID-19"	https://bit.ly/37QMJS M

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Airborne transmission of SARS-CoV-2: The world should face the reality	Lidia Morawska (a) Junji Cao (b)	a: International Laboratory for Air Quality and Health (ILAQH), School of Earth of Atmospheric Sciences, Queensland University of Technology, Brisbane, Queensland 4001, Australia b: Key Lab of Aerosol Chemistry & Physics (KLACP), Chinese Academy of Sciences, Beijing, China	"The fact that there are no simple methods for detecting the virus in the air does not mean that the viruses do not travel in the air. " "Considering the many similarities between the two SARS viruses and the evidence on virus transport in general, it is highly likely that the SARS-CoV-2 virus also spreads by air"	https://bit.ly/2zV5Sqq
Rapid Expert Consultation on the Possibility of Bioaerosol Spread of SARS-CoV-2 for the COVID-19 Pandemic (April 1, 2020)	Harvey V. Fineberg	M.D., Ph.D., Chair, Standing Committee on Emerging Infectious Diseases and 21st Century Health Threats	"Currently available research supports the possibility that SARS-CoV-2 could be spread via bioaerosols generated directly by patients' exhalation."	https://bit.ly/3dnmnt0
After 6 Months, Important Mysteries About Coronavirus Endure		NYT	"Here are some of the things we don't know yet: The amount of virus it takes to make you sick"	https://nyti.ms/3hOwDhd
Droplets and Aerosols in the Transmission of SARS-CoV-2	Matthew Meselson, Ph.D.	Harvard University	"Aerosols from infected persons may therefore pose an inhalation threat even at considerable distances and in enclosed spaces, particularly if there is poor ventilation."	https://bit.ly/2NkhjLn
Aerosol and Surface Stability of SARS-CoV-2 as Compared with SARS-CoV-1		NEJM	"Our results indicate that aerosol and fomite transmission of SARS-CoV-2 is plausible, since the virus can remain viable and infectious in aerosols for hours and on surfaces up to days"	https://bit.ly/2Bwafs8
When the Office Is Like a Biohazard Lab	David Gelles	NYT	"“One of the biggest reasons for going back into the offices is so people can collaborate,” Mr. Underhill said. “But when the whole premise is to stay away from people and wear masks, it challenges the very reasons why people would be coming back.”" "“Coming back is for social interaction and collaboration,” Mr. Falzon said.	https://nyti.ms/3dpbs1M

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			"If people have to stay six feet apart and have to wear masks, why are we bringing them back?"	
Advice on the use of masks in the context of COVID-19		WHO		https://bit.ly/2NkaVDI
CDC Activities and Initiatives Supporting the COVID-19 Response and the President's Plan for Opening America Up Again		CDC		https://bit.ly/2YkZFxd
When Will It Be Safe to Sing Together Again?	Matthias Echternach	NYT	"aerosols simply hit the shield, then spread out around it and into the room"	https://nyti.ms/3eISkTV
Aerosol emission and superemission during human speech increase with voice loudness	Sima Asadi, Anthony S. Wexler, Christopher D. Cappa, Santiago Barreda, Nicole M. Bouvier & William D. Ristenpart		"rate of particle emission during normal human speech is positively correlated with the loudness (amplitude) of vocalization" "a small fraction of individuals behaves as "speech superemitters," consistently releasing an order of magnitude more particles than their peers"	https://go.nature.com/3dnnVmO
CDC Quickly Changed Its Guidance On Limiting Choirs At Religious Services		NPR	""Consider suspending or at least decreasing use of a choir/musical ensembles and congregant singing, chanting, or reciting during services or other programming, if appropriate within the faith tradition. The act of singing may contribute to transmission of COVID-19, possibly through emission of aerosols."" "But that wording disappeared over the weekend, apparently because the White House had not approved it."	https://n.pr/2Yo5oCF
NATS Panel of Experts Lays Out Sobering Future for Singers: "No Vaccine, No Safe Public Singing"		NATS	"there is no safe way for singers to rehearse together until there is a COVID-19 vaccine and a 95% effective treatment in place, in her estimates at least 18-24 months away." "There is no spacing solution for singing groups that would eliminate risk." "Masks don't provide safe methods of singing"	https://bit.ly/37QOrUc
Considerations for Reintegrating Into the Dance Studio		The Dance Docs		https://bit.ly/3dnrNnA

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Talking Can Generate Coronavirus Droplets That Linger Up to 14 Minutes		NYT	"Talking can also launch thousands of droplets so small they can remain suspended in the air for eight to 14 minutes, according to a new study."	https://nyti.ms/3dny5Ug
The airborne lifetime of small speech droplets and their potential importance in SARS-CoV-2 transmission	Valentyn Stadnytskyi, Christina E. Bax, Adriaan Bax, and Philip Anfinrud		"Speech droplets generated by asymptomatic carriers of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) are increasingly considered to be a likely mode of disease transmission. Highly sensitive laser light scattering observations have revealed that loud speech can emit thousands of oral fluid droplets per second. In a closed, stagnant air environment, they disappear from the window of view with time constants in the range of 8 to 14 min, which corresponds to droplet nuclei of ca. 4 μm diameter, or 12- to 21-μm droplets prior to dehydration. These observations confirm that there is a substantial probability that normal speaking causes airborne virus transmission in confined environments."	https://bit.ly/3ez46dL
COVID-19 FAQ for Dancers and Dance Companies Returning to the Studios		Dance USA Task Force on Dancer Health	"A mask will make it harder to breathe during exercise initially and dancers should self-monitor for symptoms of: lightheadedness, dizziness, numbness or tingling, and shortness of breath " " "Sharing the same air for longer than 10 minutes increases the chances of exposure and infection." "Social distancing is hard to maintain in the dance environment due to partnering, choreography, and close formation spacing. Significant modification may be required "	https://bit.ly/COVID_Dance
High SARS-CoV-2 Attack Rate following Exposure at a Choir Practice	Lean Hamner, Polly Dubbel, Ian Capron, Andy Ross, Amber Jordan, Jaxon Lee, Joanne Lynn, Amelia Ball, Simranjit Narwal, Sam Russell, Dale Patrick, Howard Leibrand	CDC		https://bit.ly/3ekPA96

Article	Author	Credentials/ Affiliations	Notes	Link
Where have all the singers gone, and when will they return? Prospects for Choral Singing after the SARS-CoV-2 Pandemic	Martin Ashley	ABCD Choral Directions Research / European Choral Association	<p>Extensive pulling together of information from European Choral Singers group, including further links over how they are dealing with the pandemic. The term “COVID-19” is the one in popular usage to refer to the pandemic, although the correct medical name for the virus responsible is SARS-CoV-2, which is more indicative of the relationship with previous forms of coronavirus for which no immunity existed. SARS-CoV-2 differs from previous coronaviruses in that, whilst less lethal to individuals than, for example MERS, the SARS-CoV-2 appears unusually contagious and, for reasons not yet fully understood, both highly variable and unpredictable in how it affects individuals. Effects range between asymptomatic infection through mild flu-like symptoms to respiratory or multi-organ failure and death. It is also difficult to control the spread because it is carried by asymptomatic individuals – people who feel and appear perfectly healthy. Critically, Lai and colleagues established that over 97% of particles emitted during vuvuzela playing or shouting were between 0.5 and 5 µm in diameter. This would class them as aerosols. An aerosol particle is defined as invisible to the eye, typically 1 µm in diameter (Papineni and Rosenthal, 1997). Aerosols tend to remain suspended in the atmosphere for some time as opposed to particles larger than 5 µm which fall to the ground over distances that can be mapped and predicted by testing. Lindsley et al (2009) undertook significant work on the size of the expelled particles that carry the virus, identifying particles with a mean diameter 13.5 µm for coughing and 16.0 µm for speaking. This appears to disagree with Lai et al’s stress on smaller particles and is where worrying uncertainty begins. A study published in 2019 before the current pandemic investigated the effects of “non-dramatic” events upon airborne infectious disease transmission. “Dramatic events” were considered to be coughing and sneezing. Normal speech as an additional carrier of respiratory pathogens was found to be positively correlated with amplitude (the volume at which people were speaking or shouting). Contamination ranged from 1 to 50 particles per second according to the extent the voice was projected. In other words, as the vocal folds are excited more vigorously, aerosol transmission increases rapidly by as much as fifty-fold. Singing would appear to be at least as harmful in this respect as loud speech or shouting, possibly more so. Nelson concluded that there is not yet a full consensus on whether the SARS-CoV-2 can be transmitted as a live virus in aerosol. She did, however, concede that</p>	https://bit.ly/2NheM4r

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			aerosols could be “very, very efficient carriers of the virus” and that any choir might have amongst its members an unknown, random “super spreader”. She was against the use of face masks on the grounds already suggested above as well as difficulties with breathing, particularly for older people. Legal issues as to whether churches could compel the wearing of masks would appear to have been raised in the United States. The position in the UK on this issue is as yet unclear.	
The central question when making music in corona time: can the virus spread through the air?	Dr. ir. Ivo Bouwmans (TU Delft): research coordination and website; support by experts in transport phenomena and system modelling • Prof. dr. ir. Bert Blocken (TU/e): aerosol studies • Jos van der Sijde (RPhO): Coordination on behalf of Dutch music organisations • Advisors virology: prof. dr. Louis Kroes (LUMC) and prof. dr. Rogier Sanders (UvA)	Virmus NL serving musicians	The large droplets are likely to cause the majority of infections [2]. But everyone knows by now that we can avoid those drops, because it is established that they usually fall to the ground within about a meter and a half [3].	https://bit.ly/2Nhi9ID

Article	Author	Credentials/ Affiliations	Notes	Link
How far droplets can move in indoor environments – revisiting the Wells evaporation–falling curve	Dr Yuouo Li	Department of Mechanical Engineering, The University of Hong Kong	Science behind indoor droplet distances and evaporation from speech and coughs; The present study only considered the exhalation jet flows without considering the room airflow field. Our results indicate that a droplet's size predominately dictates its evaporation and movement after being expelled. The sizes of the largest droplets that would totally evaporate before falling 2 m away are determined under different conditions.	https://bit.ly/3dfIC40
Face masks for the general public	Comittee for Royal Society	Royal Society Delve initiative	<u>In addition to events such as coughs and sneezes producing respiratory emissions, speech has also been found to produce substantial numbers of droplets capable of containing respiratory pathogens¹⁵. To this effect, several studies have assessed the usefulness of different types of masks in mitigating emissions from an individual to the environment. Masks made from cloth or household materials have been found to filter pathogens less effectively than surgical masks, with efficiency estimates relative to surgical masks ranging from approximately 70% in a study using bacteria and bacteriophage⁴¹, to approximately 50% in a study of airborne particles⁴².</u>	https://bit.ly/2NgLB1F
Natural Ventilation for Infection Control in Health-Care Settings.	WHO	WHO	<u>" Even a patient simply sitting in or beside the bed will create air temperature differences from their body heat. A higher air temperature directly above the patient's head (or body, if lying down) will create convective air currents that may entrain potentially infectious air from neighbouring spaces into the higher temperature column rising air above the patient (Craven & Settles, 2006). Patients lying in bed, breathing or sleeping, may produce exhaled airflows that can reach the airspace of a patient in the neighbouring bed, and even further in the presence of certain types of ventilation systems (see below) (Qian et al., 2006). In the same way, other mechanical devices, including fans, televisions and medical equipment, may also disturb nearby airflows and disseminate air from nearby patients to the rest of the ward. "</u> There is much more in the master document that this section comes from!	https://bit.ly/37OUmJy
Number of coronavirus (COVID-19) cases worldwide as of June 15, 2020, by country	John Elflein	Statista.com	World COVID figures updated daily in graphs	https://bit.ly/37OLd3D
Coronavirus (COVID-19) deaths worldwide per one million population as of June 15, 2020, by country	Raynor de Best	Statista.com	Deaths per million updated daily per country	https://bit.ly/2Yi8bwP

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COVID-19: guidance on shielding and protecting people defined on medical grounds as extremely vulnerable	UK Government	UK Gov	It's for situations where a clinically extremely vulnerable person is living at home, with or without additional support. This includes clinically extremely vulnerable people living in long-term care facilities for the elderly or people with special needs.	https://bit.ly/3ez59ud
'The Safe Way Forward' Joint Report from the DGA, SAG-AFTRA, IATSE, and Teamsters	DGA SAG AFTRA Teamsters IATSE	Multi-union report	"The Unions and Guilds quickly determined that a comprehensive, mandatory testing regimen would need to be the cornerstone of a safe return to production in a pre-vaccine landscape. Without testing, the entire cast and crew would be working in an environment of unknown risk." Full Report: https://bit.ly/2NiG1eZ	https://bit.ly/3dl6XFI
Getting the Coronavirus Twice Is Highly Unlikely (in the Short Term)	Markham Heid	Writer for - incl research links Medium.com	"The test is not designed to pick up the live virus," he explains. "It's really designed to detect the presence of nucleic acids." These nucleic acids — which are snippets of the virus's genetic information — may persist in a person's body even when the virus itself is no longer alive and able to infect others. In other words, the "re-positive" test results were actually false positives.	https://bit.ly/2YmTLM9
Will Your Soccer Club Ever Meet Again? A Guide to Outdoor Sports This Summer.	https://elemental.medium.com/@christie.asch?source=post_page-----49b2c2bdf477-----	Writer for - incl research links Medium.com	The risk posed by any particular activity, sporting events included, comes down to a few important factors: proximity to other people, the intensity of the exposure (breathing hard and talking loudly increases the risk of spreading respiratory droplets), and time. Even if it's outdoors, basketball is high risk, because you're throwing a ball back and forth and breathing hard in close proximity to one another.	https://bit.ly/37OBMRI
Coronavirus May Be a Blood Vessel Disease, Which Explains Everything	Dana G Smith	Senior Writer for Elemental @ Medium covering health, science, and the science of wellness	If Covid-19 is a vascular disease, the best antiviral therapy might not be antiviral therapy	https://bit.ly/3dpM2RI
Use of Cloth Face Coverings to Help Slow the Spread of COVID-19	Content source: National Center for Immunization and Respiratory Diseases (NCIRD), Division of Viral Diseases	Content source: National Center for Immunization and Respiratory Diseases (NCIRD), Division of Viral Diseases	<u>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.</u>	https://bit.ly/2YivID6

Article	Author	Credentials/ Affiliations	Notes	Link
How Can You Tell the Difference Between Anxiety and COVID-19 Symptoms?	Renée Fabian is the features editor at The Mighty.	blog	<u>Anxiety and panic can cause physical symptoms that may resemble early COVID-19 symptoms, including shortness of breath and even chills or aches and pains like you have the flu.</u>	https://bit.ly/3emUoe1
Guidance on voice and upper airway disorders in the context of COVID-19 in adult and paediatric services	Multiple NHS involvement	Royal College of Speech and Language Therapists (RCSLT)	Flow chart: SUGGESTED CARE PATHWAY FOR SLT MANAGEMENT OF UPPER AIRWAY DISORDERS IN LIGHT OF COVID-19	https://bit.ly/2NilExn
Expecting Students to Play It Safe if Colleges Reopen Is a Fantasy	Laurence Steinberg	Dr. Steinberg is a professor of psychology at Temple University and the author of "Age of Opportunity: Lessons From the New Science of Adolescence."	I look forward to a time when we are able to return to campus and in-person teaching. But a thorough discussion of whether, when and how we reopen our colleges and universities must be informed by what developmental science has taught us about how adolescents and young adults think. As someone who is well-versed in this literature, I will ask to teach remotely for the time being.	https://nyti.ms/2zVbDEy
Coronavirus Resource Centre	Harvard Health Publishing	Harvard Medical School	Based on what we know about the contagiousness of the COVID-19 virus, experts estimate that somewhere between 60% and 70% of the population needs to be immune in order to achieve herd immunity. That's close to 200 million people in the United States, and nearly five billion people worldwide. (As of now, we are nowhere close to the numbers needed to achieve herd immunity.)	https://bit.ly/2NfjGtV
All Hands on Deck: Initial Guidance Regarding Reopening School Buildings		National Education Association	Most important factors in considering reopening are: health and safety based on science ("Testing capacity in the United States remains inadequate and uneven. This is especially true in under-resourced communities"), Educator voices participating in all levels of decision making, institution-provided protection (we must ensure that all students and educators continuously funded access to PPE") and the need to "lead with equity." Includes a 15-point checklist at the bottom of the article	https://bit.ly/3dmE4cf
Stay 6 Feet Apart, We're Told. But How Far Can Air Carry Coronavirus?	Knvul Sheikh, James Gorman and Kenneth Chang	NYT	"If the aerosols that people exhale in other settings are significant in spreading the disease, the six-foot distance would not be completely protective because those are carried more easily by air currents."	https://nyti.ms/2NiKxKs

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This 3-D Simulation Shows Why Social Distancing Is So Important		NYT	<p>"In fact, researchers at M.I.T. studying coughs and sneezes observed particles from a cough traveling as far as 16 feet and those from a sneeze traveling as far as 26 feet."</p> <p>"An infected person talking for five minutes in a poorly ventilated space can produce as many viral droplets as one infectious cough. "If there are 10 people in there, it's going to build up," said Pratim Biswas, an aerosols expert at Washington University in St. Louis."</p>	https://nyti.ms/2Nuwc eh
A physicist view of the airborne infection	Luis A. Anchordoqui, Eugene M. Chudnovsky	Cornell University	<p>"In the presence of air resistance, compact heavy objects fall to the ground quickly, while light objects exhibit Brownian motion and follow the pattern of turbulent convection of the air. For aerosol particles containing the virus, the boundary between these two behaviors depends on the size of the particle."</p> <p>"From the physics point of view, we cannot find a good justification for a stationary 6-feet separation in a situation when people spend long time together in a room. Droplets containing the virus move in the air via convection. The convection pattern in a room can be very complex; see Fig. 1. It depends on the location of air conditioners, radiators, windows, and all items in the room, as well as on people producing vortices by moving around. The existing vortices in the air can make a location far away from the source of droplets more dangerous than the location 6 feet away"</p>	https://bit.ly/3ez9dKZ
Temperature, Humidity, and Latitude Analysis to Estimate Potential Spread and Seasonality of Coronavirus Disease 2019 (COVID-19)	Mohammad M. Sajadi, MD; Parham Habibzadeh, MD; Augustin Vintzileos, PhD	Journal of the American Medical Association	In this study, the distribution of substantial community outbreaks of COVID-19 along restricted latitude, temperature, and humidity measurements were consistent with the behavior of a seasonal respiratory virus; with modeling, it may be possible to estimate areas at high risk of substantial community transmission of COVID-19.	https://bit.ly/2AW9VD h

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The Urgency and Challenge of Opening K-12 Schools in the Fall of 2020	Joshua M. Sharfstein, MD; Christopher C. Morphey, PhD	Journal of the American Medical Association		https://bit.ly/2YSY68Q
Airborne Spread of SARS-CoV-2 and a Potential Role for Air Disinfection	Edward A. Nardell, MD; Ruvandhi R. Nathavitharana, MD, MPH	Journal of the American Medical Association	Other than natural or mechanical ventilation, only 2 practical methods of air disinfection exist: room air cleaners (ie, using filters, UV, or other means of disinfection) and upper-room germicidal UV (GUV) fixtures (see eFigure in the Supplement). For effective air disinfection, ventilation with 6 to 12 room air changes per hour is recommended by the CDC. ² This can be achieved with natural ventilation under favorable outdoor conditions and by mechanical ventilation systems designed for such high-flow rates—but at high operating costs when intake air must be heated or cooled and dehumidified. Portable room air cleaners may be a potential solution, but depending on room volume, their specified clean air delivery rates generally add too few equivalent air changes per hour to provide adequate protection against airborne infection. In contrast, commercially available upper-room GUV air disinfection (with an effective rate of air mixing) has been shown, in clinical settings, to reduce airborne tuberculosis transmission by 80%, equivalent to adding 24 room air changes per hour.	https://bit.ly/2BrgPjW
A Harm-Reduction Approach to Coronavirus Disease 2019 (COVID-19)—Safer Socializing	Eric Kutscher, MD; Richard E. Greene, MD, MHPE	Journal of the American Medical Association	A harm-reduction approach to COVID-19 reflects what we saw in Central Park: going places with substantial space and air circulation, staying 6 feet apart, wearing facemasks when closer than 6 feet, and performing frequent hand hygiene. ⁶ It also requires staying inside if individuals have a fever, other COVID-19 symptoms, or a recent exposure to an individual with COVID-19. All decisions in a harm-reduction approach must be thoughtful, intentional, and negotiated. We must obtain the consent of our social partners before any interaction and establish guidelines for safety. We must not judge others who come to different conclusions about what risk is tolerable to them.	https://bit.ly/2CuxymT

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Coronavirus: Could social distancing of less than two metres work?	David Shukman Science editor	BBC	<p>A crowded stuffy room is bound to increase the chances of infection.</p> <p>The direction of air flow is also crucial - whether a draught or fan behind someone infected is pushing any virus they breathe out towards you.</p> <p>And a good supply of fresh air can make all the difference.</p> <p>Plastic screens are suggested along with moving to shift patterns of work to minimise the numbers in at any one time.</p> <p>Arranging seating so people are not face to face is also judged to help.</p>	https://bbc.in/37QXuow
No hymns, no Communion: Germany's reopened churches offer a road map, but a new outbreak shows the risks	ERIK KIRSCHBAUM	LA Times	<p>But hopes for a smooth return to churchgoing suffered a setback when word emerged of an outbreak centered on the congregation of a Baptist church in Frankfurt after a May 10 service.</p> <p>Of 180 worshipers in attendance, up to 130 became infected, according to German news reports. Those reportedly hospitalized included the church's leader and his deputy.</p>	https://lat.ms/3erDY4g
Episode 33: Risk Assessment for Group Activities with Dr. Amesh Adalja of Johns Hopkins Center for Health Security	Dr. Amesh Adalja	Choralosophy Podcast, Johns Hopkins		https://bit.ly/2NfzCBp
Singing Safely in the COVID Era	Lee Reussner MD	Kansas Voice Center	Series of three YouTube broadcasts	https://youtu.be/jY_HueZBRNg https://youtu.be/JM1msYMn5vA

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				https://youtu.be/mMJXpRUkg0o
Your Building Can Make You Sick or Keep You Well	<p>Joseph Allen (@j_g_allen) is director of the Healthy Buildings program at Harvard T.H. Chan School of Public Health and a co-author of “Healthy Buildings: How Indoor Spaces Drive Performance and Productivity.” While Dr. Allen has received funding for research through various companies, foundations and nonprofit groups in the building industry, none had any involvement in this article.</p>	NY Times	There is also ample evidence that viruses survive better at low humidity — precisely what happens during winter, or in the summer in air-conditioned spaces.	https://nyti.ms/2BxG9oc
What’s the Risk of Catching Coronavirus From a Surface?	<p>Tara Parker-Pope is the founding editor of Well, The Times’s award-winning consumer health site. She won an Emmy in 2013 for the video series</p>	NY Times	<p>“There’s a long chain of events that would need to happen for someone to become infected through contact with groceries, mail, takeout containers or other surfaces,” said Julia Marcus, an infectious disease epidemiologist and assistant professor in the department of population medicine at Harvard Medical School. “The last step in that causal chain is touching your eyes, nose or mouth with your contaminated hand, so the best way to make sure the chain is broken is washing your hands.”</p>	https://nyti.ms/2zVbKQl

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	“Life, Interrupted” and is the author of “For Better: The Science of a Good Marriage.” @taraparkerpope			
What Bus Transit Operators Need to Know About COVID-19	NCIRD	Content source: National Center for Immunization and Respiratory Diseases (NCIRD), Division of Viral Diseases	CDC recommends wearing cloth face coverings in public settings where other social distancing measures are difficult to maintain, especially in areas of significant community-based transmission. Cloth face coverings may prevent people who don’t know they have the virus from transmitting it to others. These face coverings are not surgical masks or respirators and are not appropriate substitutes for them in workplaces where masks or respirators are recommended or required.	https://bit.ly/37SBVni
Simulating COVID Spread in College Setting	Lilah Burke	insidehighered.com	"If students aren't inclined to forgo optional social contact, that's the kind of thing that can overwhelm any kind of mitigation strategies," Gressman said. "There's a lot of talk about what's going to go on in the classroom and are they going to put up barriers and things like that. That stuff is really important, but one of the takeaways should be, 'It's time to move the conversation forward.' Because it doesn't matter what you do in the classroom if you don't manage all those other aspects as well."	https://bit.ly/384EIPO
Everyone Thinks They’re Right About Masks How the coronavirus travels through the air has become one of the most divisive debates in this pandemic.	Ed Yong	ED YONG is a staff writer at The Atlantic, where he covers science.	Then there are shared spaces like hallways, stairwells, and elevators in apartment buildings. Elevators pose the highest risk, Bourouiba told me, since they’re enclosed boxes with limited airflow. For stairwells and hallways, she advocated a commonsense approach: “If you hear neighbors going out, and there are 10 people in the corridor right now, maybe wait and go later.”	https://bit.ly/38997r0
Watch: It’s not just the lungs: The Covid-19 virus attacks like no other ‘respiratory’ infection				https://bit.ly/2AfuZ7n
Risk Assessment for freelance performers returning to work during COVID-19	British Association for Performing Arts Medicine			https://bit.ly/2NE66VU

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Estimation of COVID-19 airborne transmission	Prof. Jose L Jimenez, Dept. of Chem. and CIRES, Univ. of Colorado-Boulder		https://cires.colorado.edu/news/covid-19-airborne-transmission-tool-available	https://bit.ly/2YKJNUQ
CBS Evening News segment about the role of aerosols in the spread of the SARS-CoV-2 virus	Professor Kimberly Prather, PhD, Distinguished Chair in Atmospheric Chemistry at UC San Diego			https://bit.ly/2AfvHI3
Coronavirus Face Masks: What You Should Know		WebMD.com	<p>A cloth face mask won't totally block the coronavirus. But it's an added layer of protection for you and the people around you when you use it along with regular handwashing and social distancing measures like staying 6 feet away from others.</p> <p>Research has found that "quilter's cotton" filters out a lot of particles, especially tight weaves with thicker threads, such as batik. Masks with cotton outer layers and flannel inner layers also work well.</p> <p>Masks may trap particles of the coronavirus. That's why the CDC recommends them. The virus could then spread if you touch the mask and don't wash your hands afterward.</p>	https://wb.md/3eDgZDw
Here's what WHO says your mask should have to prevent COVID-19 spread	Beth Mole	Health Reporter, arsTechnica	<p>The WHO determined that a minimum of three layers is required for fabric masks. But, masks may need more, depending on the fabric used. For instance, folding cotton handkerchiefs into four layers still only led to maximum filtration efficiency of 13 percent, the WHO noted. Notably, the homemade masks recommended by the US CDC only have two or three layers of cotton.</p> <p>Van Kerkhove noted in the press conference that "the evidence we have through this research is that, with those three layers and in that combination, that fabric [masks] can actually provide a mechanistic barrier. If someone were infected with COVID-19, it could prevent those droplets from going through and infecting someone else."</p>	https://bit.ly/2Ze8f08

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Coronavirus disease (COVID-19) advice for the public: When and how to use masks		World Health Organization	Outlines materials, how to use masks, preferred mask materials, types of masks, WHO recommendations for mask usage	https://bit.ly/3dGdOcF
Paging Dr. Hamblin: Can AC Spread the Coronavirus?	James Hamblin, MD	Staff writer at The Atlantic. He is also a lecturer at Yale School of Public Health and author of the forthcoming book Clean: The New Science of Skin.	<p>The airborne spread of the coronavirus has been well documented. Famously, outbreaks have emerged from choir practices and other indoor gatherings, with infection rates so uniquely high that it's unlikely everyone got infected by touching the same surface. Over a long period in an enclosed space, it seems, singing can spew virus into the air until it accumulates to the point of danger for people who are well over six feet away.</p> <p>Once a virus is hanging in the air—and we know that the coronavirus can linger for hours—it will travel with air currents. One ominous study of a restaurant in Guangzhou, China, documented how air-conditioning appeared to spread the virus between tables at opposite sides of the room. The issue wasn't that the virus was traveling through the air-conditioning unit, but that it was getting pushed around the room by the stream of air. The takeaway is that while airflow is good when it's coming from open windows, it could make things worse when it's coming from an AC unit that's blowing air around a closed room. Coughing in a well-ventilated room is sort of like peeing in a river as opposed to a hot tub: Ideally you wouldn't do either, but one is definitely worse.</p> <p>In light of the pandemic, various professional organizations have issued new recommendations for building ventilation, but how widely they'll be followed is unclear. The fixes aren't actually groundbreaking: They're mostly things that everyone was supposed to be doing all along, such as ensuring that bathrooms have exhaust fans and that air filters are changed regularly and of high-enough quality to catch the virus. That means they should be high-efficiency particulate air (HEPA) filters or MERV-rated 13 or 14, which are essentially the N-95 masks of air filters.</p> <p>Without more stringent government protections, the best you can do while traveling is look for third-party certifications such as LEED or WELL. Buildings that have gone through those certification processes are guaranteed to have ventilation systems that go well beyond the typical standards.</p>	https://bit.ly/2BF1nRg

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COVID-19 (CORONAVIRUS) PREPAREDNESS RESOURCES		ASHRAE	<p>Transmission of SARS-CoV-2 through the air is sufficiently likely that airborne exposure to the virus should be controlled. Changes to building operations, including the operation of heating, ventilating, and air-conditioning systems, can reduce airborne exposures.</p> <p>Ventilation and filtration provided by heating, ventilating, and air-conditioning systems can reduce the airborne concentration of SARS-CoV-2 and thus the risk of transmission through the air. Unconditioned spaces can cause thermal stress to people that may be directly life threatening and that may also lower resistance to infection. In general, disabling of heating, ventilating, and air-conditioning systems is not a recommended measure to reduce the transmission of the virus.</p>	https://bit.ly/2BM6a3y
Scientists Consider Indoor Ultraviolet Light to Zap Coronavirus in the Air	Kenneth Chang	NY Times	<p>In the approach scientists like Dr. Nardell describe, fixtures mounted on walls or ceilings, similar to fluorescent lights used today, shine ultraviolet light across the top of an interior space, well above people's heads. Ceiling fans are sometimes installed to draw air upward so that floating bacteria, viruses and fungi are zapped more quickly. A different frequency of ultraviolet might be even safer, even when it shines directly on people, which would also allow disinfection of surfaces.</p>	https://nyti.ms/3eMalKy
Considerations for Wearing Cloth Face Coverings		Centers for Disease Control	<p>Cloth face coverings are recommended as a simple barrier to help prevent respiratory droplets from traveling into the air and onto other people when the person wearing the cloth face covering coughs, sneezes, talks, or raises their voice. This is called source control. This recommendation is based on what we know about the role respiratory droplets play in the spread of the virus that causes COVID-19, paired with emerging evidence from clinical and laboratory studies that shows cloth face coverings reduce the spray of droplets when worn over the nose and mouth. COVID-19 spreads mainly among people who are in close contact with one another (within about 6 feet), so the use of cloth face coverings is particularly important in settings where people are close to each other or where social distancing is difficult to maintain.</p>	https://bit.ly/2YKP4fg