

# Music Unlocked

## Literature Review

This document is a collation of research which informed our findings for the Music Unlocked guidance documents, with [Guidance for School Leaders on Musical Learning and COVID-19](#) and [Guidance for Providers](#) published on the Music Mark website.

This is a live document and will be updated with new and relevant material. Sources have been categorised into the following sections below:

- Recommendations for Ensembles
- Instrument Maintenance and Cleaning Advice
- Singing
- Aerosol Emission and Air Flow
- General Hygiene of Woodwind and Brass Instruments
- Coronavirus – General

### Recommendations for Ensembles

- **Prof. Dr. Christian J. Kähler and Dr. Rainer Hain, ‘Singing in choirs and making music with wind instruments – Is that safe during the SARS-CoV-2 pandemic?’ (2020)**  
[https://www.unibw.de/lrt7-en/making\\_music\\_during\\_the\\_sars-cov-2\\_pandemic.pdf](https://www.unibw.de/lrt7-en/making_music_during_the_sars-cov-2_pandemic.pdf)  
*A study from the University of the Bundeswehr Munich into the safety distance of musical activities, including singing, brass, and wind instruments. Explores air movement and droplet emission in different instruments and offers solutions including playing outdoors and use of popshields.*
- <https://www.youtube.com/watch?v=BYo3wlWUDDM&feature=youtu.be>  
*Youtube video posted by user LRT7 about the above study by Dr Kähler and Dr Hain, with video demonstrations for the experiments.*
- **Prof. Erin Bromage, ‘The Risks - Know Them - Avoid Them’ (May 2020)**  
<https://bit.ly/3ep6vXP>  
*Guide from Assoc. Prof. of Biology at the [University of Massachusetts Dartmouth](#) about how to approach various activities during the pandemic including choirs and singing, with alarming anecdotes.*
- **Orchestra Management, ‘Orchestra Management – Recommendations for Orchestras returning to new normal’ (May 2020)**  
<https://orchestramanagement.wordpress.com/2020/05/04/returning-to-a-new-normality-for-orchestras-during-covid19-recommendations/>  
*Written in Germany, collected recommendations for orchestras returning to work, including rehearsal guidelines, social distancing, protective equipment (e.g. covering bell with cloth cover, Perspex separators).*

## Instrument Maintenance and Cleaning Advice

- **National Federation of State High Schools Associations, ‘Covid-19 Instrument Cleaning Guidelines’ (2020)**  
<https://www.nfhs.org/articles/covid-19-instrument-cleaning-guidelines/>  
*Provides clear instructions for how to clean each instrument type without causing damage, whilst providing suggested lifespan of the virus on different instrument materials.*
- **Music Industries Association, ‘Musical Instrument Hygiene’ (May 2020)**  
<https://www.mia.org.uk/2020/05/getting-ready-to-re-open-our-music-shops-musical-instrument-hygiene-2/>
- **Volkwein’s Music, ‘COVID-19 and Instrument Hygiene for Musicians’, (2020)**  
<https://www.volkweinsmusic.com/pages/special>  
*Basic protocol for instrument hygiene (particularly shared or rented instruments), warning against the sharing of mouthpieces and reeds. Includes useful links to US-based other resources.*
- **Pbone.co.uk, ‘Coronavirus; keeping your instruments clean’, (March 2020)**  
<https://blog.pbone.co.uk/top-tips-for-taking-care-of-your-instruments>  
*Warwick Music share hygiene tips and offer additional mouthpieces free of charge.*

## Singing

- **abcd, ‘Abcd Publishes Research Paper On The Impact Of COVID 19 On Choral Activity’, (June 2020)**  
<https://www.abcd.org.uk/news/2020/06/abcd-publishes-research-paper-on-the-impact-of-covid19>  
*The report, prepared by Professor Martin Ashley, an **abcd** trustee, provides a survey of research into the current thinking about how choirs and conductors might resume rehearsing and performing. [Read the report here.](#)*
- **Chorus America, ‘Singing and Reopening Safely in the Time of the Coronavirus’, (May 2020)**  
<https://www.chorusamerica.org/resource/top-resource/singing-reopening-safely-time-coronavirus>  
*Chorus America share resources following webinar exploring the science of singing and virus transmission, looking into aerosol emission and droplets, voice volume, and distance.*
- **Chorus America, presented in partnership with National Association of Teachers of Singing (NATS) YouTube webinar, ‘Singing: What we can do’, (Streamed 26 May 2020).**  
<https://www.youtube.com/watch?v=lhXpCQlpE3M>  
*Expert singing panel discuss how they are overcoming the challenges of social distancing and offer practical solutions and tech advice.*

- **The Middleclass Artist, ‘NATS Panel of Experts Lays Out Sobering Future for Singers: “No Vaccine, No Safe Public Singing”’ (May 2020)**  
<https://www.middleclassartist.com/post/nats-panel-of-experts-lays-out-sobering-future-for-singers-no-vaccine-no-safe-public-singing>  
*Closer look from the Medical Director at the University of South Carolina at the dangers of singing from a cautious perspective, warning against wearing masks while singing and how even regular room ventilation may not prevent transmission. [Webinar here.](#)*
- **Medium.com, Sara Austin, ‘Why Singers might be covid-19 super-spreaders’ (May 2020)**  
<https://elemental.medium.com/why-singers-might-be-covid-19-super-spreaders-57607ed71b9b>  
*Article refers to anecdotes of outbreaks traced back to singing events and investigates the aerosol-emitting quality of singing. Singing remotely with technology is not a replacement for singing together but can provide some enjoyment as the only alternative.*
- **Slipped Disc, ‘Concertgebouw Chorus Is Devastated After Pre-Covid Bach Passion, (May 2020)**  
<https://slippedisc.com/2020/05/concertgebouw-chorus-is-devastated-after-pre-covid-bach-passion/>  
*Amsterdam choir performance leads to large outbreak with fatalities.*

## Aerosol Emission and Air Flow

- **Nature.com. Asadi, Wexler, Cappa, et al. ‘Aerosol emission and superemission during human speech increase with voice loudness’ (2019)** <https://doi.org/10.1038/s41598-019-38808-z>  
*Study showing how the rate of particle emission during speech positively correlates with loudness. Small fraction of people act as ‘speech super-emitters’, releasing more particles than their peers. These people could also be superspreaders.*
- **Medical Xpress, ‘Vienna Philharmonic says no increased virus risk for orchestras’ (May 2020)**  
<https://medicalxpress.com/news/2020-05-vienna-philharmonic-virus-orchestras.html>  
*Used fog/mist in dark room exhaling out of instruments to show how far it dispersed, concluding “An artist’s exhalation air is therefore not expected to expand by more than ~ 80cm”.*
- **Brass Bands England, ‘Investigation into the Release of Respiratory Aerosols by Brass Instruments and Mitigation Measures with Respect to Covid-19’ (August 2020)**  
*The results of a set of investigations into the release of respiratory aerosols by brass instruments. News summary at <https://www.bbe.org.uk/news/04082020-1628/brass-bands-england-releases-laboratory-research-results> and full paper at <https://www.medrxiv.org/content/10.1101/2020.07.31.20165837v1>*
- **University of Colorado research commissioned by the National Federation of State High School Associations (NFHS), the College Band Directors National Association (CBDNA) and more than 125 performing arts organizations**  
*Study examining aerosol rates produced by wind instrumentalists, vocalists, and even actors, and how quickly those aerosol rates accumulate in a space. Initial findings at <https://www.nfhs.org/articles/unprecedented-international-coalition-led-by-performing-arts-organizations-to-commission-covid-19-study/>*

- University of Bristol, ‘New COVID-19 study could help performers back on the stage’ (July 2020)**  
*A report on the PERFORM (Particulate Respiratory Matter to Inform Guidance for the Safe Distancing of Performers in a COVID-19 Pandemic) research project can be found at <https://medicalxpress.com/news/2020-07-covid-stage.html>*
- Bamberg Symphony orchestra, ‘Scientists measure aerosol emissions’ (May 2020)**  
<https://www.br.de/nachrichten/bayern/bamberger-symphoniker-wissenschaftler-messen-aerosolausstoss.Ry6T6OU?fbclid=IwAR0q9LfNqv3QFBZ6EiWDIKs2vvNEnBJKb96oYhDa-PeKx6ePGu9jQqy5RrQ> (English Translation can be [sent on request](#) as PDF)  
*Commissioned scientists to measure airflow through instruments. Compared to directing blowing or coughing where there is severe turbulence, there was ‘hardly any measurable breathing air movements with woodwind and brass players,’ nor for bassoon or trumpet.*
- UC/CCM COVID research: How bad is the news for voices and winds? (August 2020)**  
*Study at the University of Cincinnati looking at how performing music can spread this virus – and what musicians can do to reduce the risk. <https://moversmakers.org/2020/08/04/uc-ccm-covid-research-how-bad-is-the-news-for-voices-and-winds/>*
- Freiburger Institut für Musikermedizin, Universitätsklinikum und Hochschule für Musik Freiburg**  
*Advocates standard 2 metre distancing for ensemble players and singers, with addition of masks and plastic dividers as helpful but not essential. [Report translated from German](#)*

## General Hygiene of Woodwind and Brass Instruments

- Glass, Conrad, Kohler, Bullard, ‘Evaluation of the microbial flora found in woodwind and brass instruments and their potential to transmit diseases’. *Gen Dent.* (2011)**  
<https://www.ncbi.nlm.nih.gov/pubmed/21903519>  
*Study shows how instruments and their cases harboured potentially harmful microorganisms due to poor hygiene.*
- Mobley, James & Bridges, Cynthia, ‘Wind Ensemble Infectious Disease Risks: A Microbiological Examination of Water Key Liquids in Brass Instruments’. *Texas Public Health Association Journal.* (2015)**  
[https://www.researchgate.net/publication/274082538\\_Wind\\_Ensemble\\_Infectious\\_Disease\\_Risks\\_A\\_Microbiological\\_Examination\\_of\\_Water\\_Key\\_Liquids\\_in\\_Brass\\_Instruments](https://www.researchgate.net/publication/274082538_Wind_Ensemble_Infectious_Disease_Risks_A_Microbiological_Examination_of_Water_Key_Liquids_in_Brass_Instruments)  
*Researches whether the condensation build up in brass instruments increases risk of spreading bacteria and viruses.*
- British Thoracic, ‘Playing wind instruments linked to higher risk of chest infections’ (December 2019)**  
<https://brit-thoracic.org.uk/about-us/pressmedia/2019/playing-wind-instruments-linked-to-higher-risk-of-chest-infections/>  
*Study concludes that playing wind and brass instruments does increase the risk of respiratory illness due to presence of trapped bacteria.*

## Coronavirus - General

- **UK Research and Innovation, ‘How long can coronavirus survive outside of the body?’ (May 2020)**  
<https://coronavirusexplained.ukri.org/en/article/pub0008/#ref1>  
*Studies have so far shown that SARS-CoV-2 can survive in air droplets for as long as three hours and on some hard surfaces for up to three days.*
- **ScienceAlert.com, ‘How long does coronavirus live on surfaces?’**  
<https://www.sciencealert.com/how-long-does-coronavirus-last-on-surfaces>  
*COVID-19 can remain intact on surfaces for anywhere up to 72 hours, [according to a study](#) conducted by US researchers.*
- **Tulane University, ‘Early study shows Coronavirus can live in air for over 16 hours’ (May 2020)**  
<https://news.tulane.edu/news/early-study-shows-coronavirus-can-live-air-over-16-hours>  
*Preliminary study suggests transmission of disease is possible over large distances.*
- **US National Library of Medicine, ‘Human Coronavirus 229E Remains Infectious on Common Touch Surface Materials’ (2015)**  
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4659470/>  
*NB: refers to another strain of Coronavirus, not Covid-19. Concludes coronavirus persists in an infectious state on common surface materials for several days. Copper nickels were effective at inactivating it but required higher (90%) copper content to produce a degree of inactivation.*
- **Engineering.com, ‘Copper Kills Coronavirus On Contact, So Why Isn’t Copper Everywhere?’ (March 2020)**  
<https://www.engineering.com/DesignerEdge/DesignerEdgeArticles/ArticleID/20107/Copper-Kills-the-Coronavirus-on-Contact-so-Why-Isnt-Copper-Everywhere.aspx>  
*Explores the viricidal properties of copper.*