

Press Release**Communications and media**
Philipp Kressirer

Pettenkoflerstrasse 8a 80336 Munich

Tel: +49 (0)89 4400 58070
Fax: +49 (0)89 4400 58072

Email: philipp.kressirer@med.uni-munich.de

www.lmu-klinikum.de

Results of aerosol study with the Bavarian Radio Symphony Orchestra

Scientists from the University Hospitals of Munich and Erlangen investigate aerosol distribution during playing of the trumpet, flute and clarinet

Following results from a much acclaimed study with members of the Bavarian Radio Chorus that looked at the risks of infection with coronavirus from singing, further data are now available from this extensive study by the LMU University Hospital Munich, the Universitätsklinikum Erlangen (FAU) and Bayerischer Rundfunk (BR), Bavaria's public broadcasting service. Additional analysis of the data focussed on aerosol dispersion – and thus possible virus transmission – during the playing of wind instruments, and was investigated with members of the Bavarian Radio Symphony Orchestra. According to the results, physical spacing within the orchestra, at least laterally, could be less than the currently recommended distance. The investigations were supported by the Bavarian Ministry of Science and Art.

Minister of State Bernd Sibler: 'One of my main tasks as Minister for the Arts is the facilitation of culture. During a pandemic, protecting the health of musicians and the public is particularly important. The better informed we are about coronavirus, the more targeted we can be with measures for safety in music making. And as Minister for Science, I wholeheartedly support the work of our scientists. It is absolutely fundamental for helping us come to responsible decisions. I'd like to thank all those who were involved in this study and have provided perspectives about the possible ways forward.'

Using e-cigarettes to make aerosol clouds visible

In contrast to studies that measured absolute aerosol concentration during music making, this study aimed to determine the acute dispersion and distribution of aerosols in a room when certain wind instruments were played. Professor Matthias Echternach, Head of the Division of Phoniatics and Paediatric Audiology at the Department of Otorhinolaryngology, LMU University Hospital Munich, and Dr Stefan Kniesburges, a specialist in fluid mechanics at the Universitätsklinikum Erlangen (FAU), constructed an experimental set in Studio 2 at Bavaria's public broadcasting studio at Unterföhring, Munich. During the experiment, players inhaled the carrier solution from e-cigarettes, allowing the dispersion during the playing of wind instruments to be observed and measured.



Recommended distances to the front and side

Evaluating the measurements of the aerosol clouds emitted showed that musicians would need to maintain a greater distance from colleagues in front of them than from those to either side. However, this presupposes that the room is constantly ventilated and thus the aerosols are regularly removed by fresh air. 'For the wind instruments measured, there were differences in the way aerosols dispersed towards the front', says Matthias Echternach. 'With trumpets and clarinets, our measurements showed the cloud extending from the player's mouth to a distance of 0.9 meters on average. However, individual musicians also achieved a range of 1.5 metres, so a safety gap of 2 metres to the front seems sensible. But for flutes, the forward impulse dispersion from the mouthpiece reached distances of up to 2 metres. That means a safety gap of 2 meters is not enough and 3 meters should be considered appropriate. Dispersions emitted to the side remained below one meter for all musicians. A safety gap of 1.5 meters therefore seems sufficient, in contrast to the 2 meters that has previously been recommended.'

'However', he adds, 'the data only refer to direct dispersion at natural speed during playing. For the musicians' safety, it's important that the aerosols are also continuously removed from the room so that there's no accumulation.' But the extent to which aerosols can be removed under real stage and rehearsal conditions is not yet well understood in detail, according to the study's leads: 'With regard to real rehearsal and performance conditions when making music, further studies are necessary to investigate additional measures as to their potential for risk reduction and their effects on the acoustic.'

Reduced distances allow for a larger repertoire

'This extremely thorough study provides important information about safe distances between musicians on stage. We hope that these findings will quickly be incorporated into decision-makers' guidelines', says Nikolaus Pont, manager of the Bavarian Radio Symphony Orchestra (BRSO). 'Just reducing the lateral spacing of the wind instruments alone would enable us to perform a much larger repertoire again.'

Christopher Corbett, solo clarinetist with the BRSO, adds: 'It's crucial for us as musicians to be able to hear each other well so that we can make music. It would be enormously helpful if the distances between a row of musicians within an orchestra section could be reduced. Musical and emotional communication with colleagues would become easier once more, and that would be audible in our playing.'

Contact:

Prof. Matthias Echternach

Head, Division of Phoniatics and Paediatric Audiology

Department of Otorhinolaryngology

LMU University Hospital Munich

Tel: +49 (0)89 4400 73861

email: matthias.echternach@med.uni-muenchen.de

Dr Stefan Kniesburges

Phoniatics and Paediatric Audiology

Department of Otorhinolaryngology – Head and Neck Surgery

Universitätsklinikum Erlangen

Tel: +49 (0)9131 / 85-36102

email: presse@uk-erlangen.de

For inquiries concerning Bavaria's public broadcasting service (BR):

Anna Scholder, BR press office

Tel. +49 (0)89 5900 10552 and 10560, email anna.scholder@br.de

Claudia Kreile, Bavarian Radio Symphony Orchestra

Tel. +49 (0)89 5900 34120, email: claudia.kreile@br.de

For inquiries concerning Bavarian State Ministry for Science, Research and the Arts:

Julia Graf, deputy spokesperson, Bavarian State Ministry for Science, Research and the Arts

Tel.: +49 (0)89 2186 2681, email: presse@stmwk.bayern.de

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