

## PODCAST CAPSULE SUMMARY

## Infectious Disease

# What is the real risk of COVID transmission during oxygenation?

Jeffrey L. Jarvis MD, MS<sup>1,2</sup> | John Gonzales BAAS, EMT-P<sup>1</sup><sup>1</sup> Williamson County EMS, Georgetown, Texas, USA<sup>2</sup> University of Texas Health Science Center at Houston, Houston, Texas, USA**Correspondence**

Jeffrey L. Jarvis, Williamson County EMS, Georgetown, TX, USA.

Email: [jjjarvis@wilco.org](mailto:jjjarvis@wilco.org)

**Funding and support:** By *JACEP Open* policy, all authors are required to disclose any and all commercial, financial, and other relationships in any way related to the subject of this article as per ICMJE conflict of interest guidelines (see [www.icmje.org](http://www.icmje.org)). The authors have stated that no such relationships exist.

Papers discussed: Braude D, Lauria M, O'Donnell M et al. Safety of air medical transport of patients with COVID-19 by personnel using routine personal protective equipment. *J Am Coll Emerg Physicians Open* 2021; 2, e12389.

Pearce E, Campen MJ, Baca JT et al. Aerosol generation with various approaches to oxygenation in healthy volunteers in the emergency department. *J Am Coll Emerg Physicians Open* 2021; 2, e12390.

Recently, I was called up to the intensive care unit (ICU) to intubate a hypoxic patient with coronavirus disease (COVID). Walking into the patient's room, I noted lots of people in personal protective equipment (PPE), most of whom I knew to be fully vaccinated. The patient was, indeed, hypoxic on high flow nasal cannula (HFNC). Could we put him on bi-level positive airway pressure (BiPAP) for better pre-oxygenation before rapid sequence intubation (RSI)? Nope. Hospital policy prevented the use of BiPAP (but not HFNC) on COVID patients. So, we had to accept sub-optimal pre-oxygenation because of a policy understandably designed to protect staff but that was not in the patient's best interest. Experiences like this really beg several important clinical questions: what is the risk associated with different approaches to oxygenation and how well does the PPE we wear work? Fortunately, 2 recent papers in *JACEP Open* address these questions. They give us additional data to help better understand our actual risk when treating patients with COVID.

Emily Pearce and her colleagues at the University of New Mexico report on an experiment in which they estimate the exposure from different approaches to oxygen administration (aerosol generation with various approaches to oxygenation in healthy volunteers in the emergency department [ED]).<sup>1</sup> They had 8 healthy volunteers, including the researchers themselves, breath normally in a positive pressure ED exam room while receiving oxygen from 3 devices: HFNC, non-rebreather mask (NRB), and continuous positive airway pressure

(CPAP). The HFNC was tested at 15, 30, and 60 L/min flow. They used a spectrometer to measure both large and small droplet aerosols. Finally, they placed a procedural mask over the HFNC and NRB to evaluate the impact of the common approach of mask-over-oxygen device. Ultimately, they demonstrated that higher flow oxygen led to higher aerosol generation, and CPAP was actually associated with lower aerosol generation. Masks were helpful for reduction of small particulates but not with larger ones, at least not statistically with only 8 subjects. These findings help us understand that CPAP is actually relatively low risk, certainly less than HFNC, and placing a mask over the devices may help lower exposure risk.

So, we now have more information about aerosol generation, but what about the extent to which PPE protects us against infection? Dr. Darren Braude and colleagues looked at this with a pragmatic approach. In their paper "Safety of air medical transport of patients with COVID-19 by personnel using routine personal protective equipment" they used an 8-base regional air medical consortium to describe the rate of infection among transport personnel after flying patients with COVID.<sup>2</sup> They included only patients with known or suspected COVID and then describe oxygen therapy. Most patients were receiving some form of oxygen, but only 30% were intubated. Among 108 transport staff, the overall rate of COVID infection was under 2%. This is consistent with other descriptions of PPE effectiveness among EMS personnel.<sup>3</sup>

This is an open access article under the terms of the [Creative Commons Attribution-NonCommercial-NoDerivs](https://creativecommons.org/licenses/by-nc-nd/4.0/) License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.

© 2021 The Authors. *JACEP Open* published by Wiley Periodicals LLC on behalf of American College of Emergency Physicians

Taken together, these 2 papers provide additional information we can use to guide our approach to caring for COVID patients with respiratory distress while still protecting ourselves and our colleagues. It appears that CPAP is a relatively low risk approach to respiratory support, certainly it looks like a lower risk than HFNC or NRB. In addition, we have additional reassurance that the PPE we are using provides substantial protection against infection.

## REFERENCES

1. Pearce E, Campen MJ, Baca JT, et al. Aerosol generation with various approaches to oxygenation in healthy volunteers in the emergency department. *J Am Coll Emerg Physicians Open*. 2021;2(2):e12390.
2. Braude D, Lauria M, O'Donnell M, et al. Safety of air medical transport of patients with COVID-19 by personnel using routine personal protective equipment. *J Am Coll Emerg Physicians Open*. 2021;2(2):e12389.
3. Murphy DL, Barnard LM, Drucker CJ, Counts CR, Occupational Exposures and Programmatic Response to COVID-19 Pandemic: An Emergency Medical Services Experience. 2020.

**How to cite this article:** Jarvis JL, Gonzales J. What is the real risk of COVID transmission during oxygenation?. *JACEP Open*. 2021;2:e12457. <https://doi.org/10.1002/emp2.12457>