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Air filtration technology installed in patient transport vehicles to reduce exposure to COVID-19

– Leading healthcare transport provider, the HATS Group, is fitting its vehicles with clean air technology to decrease exposure of patients and staff to airborne coronavirus.

– The first 100 HATS vehicles are being fitted with the Rensair AirBubbl and will provide transport services to London hospitals dealing with the crisis.

– High performance air filtration can remove over 95% of airborne particles that pass through the filter, including those that can carry the virus[1].

– Air filtration technology could be installed in a wide range of healthcare, public sector (e.g. school buses) and commercial vehicles, to help reduce exposure to airborne virus, particulate and gas pollutants.

1 Azimi, Parham, Dan Zhao, and Brent Stephens. "Estimates of HVAC filtration efficiency for fine and ultrafine particles of outdoor origin." Atmospheric Environment 98 (2014): 337-346.

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Leading healthcare transport provider, the HATS Group (“HATS”), is installing clean air technology in 100 vehicles used to transport patients, including those who are known or suspected COVID-19 carriers, as it aims to safeguard patients and reduce the risk of essential workers being exposed to the virus.

Coronaviruses including SARS-CoV-2 are spread via respiratory droplets produced by infected persons when they cough, sneeze, talk or breathe. While larger droplets quickly fall out of the air, smaller droplets persist as aerosols. These aerosols provide an environment in which viruses can remain alive for hours, allowing them to spread through the environment, according to recent studies from MIT and the New England Journal of Medicine[2]. Droplets and bioaerosols also lead to the contamination of surfaces, another route of transmission.

> Our focus here is on reducing exposure for workers who cannot avoid close contact with coronavirus patients

By installing air filtration devices and a suite of other measures in their patient transportation vehicles, HATS is seeking to minimise the risk of exposure to the virus for staff who will come into close contact with infected patients in confined spaces.

Rensair, which is supplying its AirBubbl in-vehicle air filters to HATS, has published a white paper on reducing exposure to airborne viruses using air filtration systems. It sets out the evidence behind airborne virus transmission and how air filtration can effectively remove bioaerosol particles.

Studies show that the amount of exposure is linked to the incidence and severity of viral disease[3], and ventilation is commonly used by hospitals to dilute and control airborne pathogens[4]. By using air filtration in an enclosed space and reducing the airborne virus load, there is a potential to reduce transmission of COVID-19 where people are in close proximity, such as ambulances, patient transport and other service vehicles.

Matthew Johnson, Professor of Chemistry at University of Copenhagen and Chief Science Officer at Rensair, said:

> *Our focus here is on reducing exposure for workers who cannot avoid close contact with coronavirus patients, and for anyone working in essential jobs in enclosed spaces.*

"The science shows that by installing air filtration devices in vehicles, it is possible to remove more than 95% of airborne particles. By decreasing the concentration of airborne particles that could contain the virus being breathed in by workers in critical environments, we reduce the risk of them being infected.

"Quantifying the potential scale of airborne virus transmission is a global challenge that many people are working to better understand. We believe a sensible approach is to use all available means to minimise the risk of exposure, in particular for those working in essential roles."

HATS originally ordered 100 AirBubbl air filtration devices from Rensair to protect its drivers and passengers from London air pollution. The installation has now been ramped up to provide an additional layer of protection for its workers from exposure to coronavirus, as its vehicles are repurposed to support London hospitals, including Chelsea and Westminster NHS Foundation Trust and St George's Hospital, which are putting protective measures in place to manage the crisis.

Ashley Stowell, Advanced Paramedic Practitioner and Clinical Director for HATS, said:

"We originally decided to install air filtration to protect our patients and our crews from London's air pollution, as part of our ongoing commitment to the health and wellbeing of our staff. As the pandemic hit, it quickly became apparent that we could repurpose our vehicles to help transport patients infected by COVID-19.

"In order to do this we decided to ramp up installation, along with the rapid deployment of extra vehicles for a number of additional services, including ITU transfers of COVID-19 patients and maternity services to a number of Hospital Trusts across London, in a bid to help reduce the cross infection on this mountain we are all having to climb."

John Wenger, Professor of Physical Chemistry at University College Cork and Director of the Centre for Research into Atmospheric Chemistry, said:

"There is increasing acceptance of the role of aerosol transmission of this virus. We will never know exactly what proportion of transmission is via droplets, aerosols, physical contact or from surfaces. But, when restrictions start to be relaxed, there will be a lot of people wearing masks on public transport, in supermarkets and elsewhere. This is because of indications that dose matters and higher exposures can lead to more severe illness.

"There is an obvious need for methods to reduce airborne transmission right now for people who cannot avoid contact with the public."

2 Studies from MIT, University of Nebraska Medical Center and New England Journal of Medicine.

3 Lunn, T.J., Restif, O., Peel, A.J., Munster, V.J., De Wit, E., Sokolow, S., Van Doremalen, N., Hudson, P. and McCallum, H., 2019. Dose–response and transmission: the nexus between reservoir hosts, environment and recipient hosts. Philosophical Transactions of the Royal Society B, 374(1782), p.20190016.

4 Department of Health, 2007. Heating and Ventilation Systems Health Technical Memorandum 03-01: Specialised Ventilation for Healthcare Premises Part A: Design and Validation.

5 CADR (Clean Air Delivery Rate) – defined as the number of cubic meters of 100% clean air produced per hour (m^3/hr)

6 Harnung, Sven E., and Matthew S. Johnson. Chemistry and the Environment. Cambridge University Press, 2012.

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