

Case Study – AIRsteril Infection control within Ambulances (CND).

Ambulances represent a front line in the NHS and have been recognized as a potential source of cross infection, placing both patients and ambulance crews at risk. The possibility of contamination begins as soon as a crew enter a vehicle and increases with every patient transferred. Ambulance personnel can protect themselves with appropriate PPE, but a combination of the relatively confined space, inadequate ventilation and level of occupation contribute to a scenario of elevated risk, with increasing air and surface contamination. The risk is particularly higher if a patient has a respiratory infection such as Coronavirus, or Tuberculosis.

The interior of ambulances cannot be easily disinfected on site or between transfers, and AIRsteril have been working closely with a major UK Ambulance Trust to reduce microbial contamination in these vehicles. Rather than the reliance on periodic manual deep cleaning or airborne treatments such as hydrogen peroxide fogging, an intrinsically safe CND (Continuous Non-depleting Disinfection) process has been developed that reduces microbial contamination levels and infection risks to both patients and staff without any changes to vehicle operation.

A validation was performed assessing the effect of an AIRsteril MVX12 medical unit installed in NHS Patient Transport Service (PTS) ambulances, on the levels of airborne and surface microorganisms. After 6 weeks operation, air plate and swab samples were taken as a baseline from 10 vehicles without an MVX12 unit installed and from the same sample points in 9 vehicles with the units fitted.

The results from the testing showed that the control vehicles were significantly less hygienic than the ambulances treated by CND:

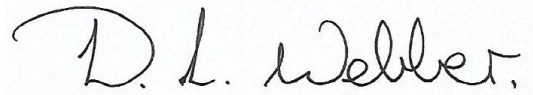
- Surface contamination – a $1.32 \log^{10} \text{cfu/cm}^2$ reduction equating to a 95.26% decrease from control vehicle levels when using the AIRsteril unit.
- Airborne contamination – A $0.73 \log^{10} \text{cfu/cm}^2$ reduction equating to an 81.45% decrease from control vehicle levels when using the AIRsteril unit.

The MVX12 purification units ran continuously when the vehicles were in use and turned off a few minutes after engine shut down automatically by operation of a battery guard. Much greater reductions in microbial levels, particularly in the levels of airborne contamination could be achieved if the AIRsteril units were kept running 24/7, this is not practicable in PTS ambulances due to battery constraints but is possible in emergency ambulances which have auxiliary batteries with power hook up.

The Ambulance Trust involved is looking to move away from traditional hydrogen peroxide fogging decontamination as this method presents operational concerns regarding health and safety, material compatibility, time taken and cost. The major regulatory agencies i.e., the WHO, CDC, HSL, EPA and FDA all advise against using fogging disinfectants in occupied areas. The AIRsteril alternative uses the intrinsically safe Continuous Non-depleting Disinfection solution, suitable for continuous operation within a working vehicle.

AIRsteril technology has been successfully used in NHS ambulances since 2015 as well as in EOC (Emergency Operation Control) centres where absenteeism was reduced by over 40%. AIRsteril has also been used in the food industry for many years to improve the microbiological quality of produce. The replacement of hydrogen peroxide fogging with CND by one major

food producer has already demonstrated significant cost and operational savings over several years, and improved product and site hygiene.

A handwritten signature in black ink that reads "D. L. Webber". The signature is written in a cursive style with a large, looping initial "D".

Dr. David L. Webber.

6th July, 2022.

