

## WellAir's Novaerus Defend 400 Significantly Reduces Airborne Bacteria in an Urgent Care Outpatient Facility<sup>1</sup>

### Testing location:

An urgent care outpatient facility located in New Jersey, USA that was running at normal capacity and actively treating patients. The testing was performed in one of their three locations in November 2021. Testing was carried out in a breakroom, examination room, nurse station and waiting room within the facility. The sizes of these environments range from 9 to 83 m<sup>2</sup>.

 NOVAERUS



### PRODUCT BACKGROUND

The Defend 400 air cleaner (WellAir) is an FDA cleared device that has previously been demonstrated to remove and inactivate micro-organisms using patented NanoStrike™ technology<sup>2</sup>. The device is compact and portable to allow for incorporation in any healthcare room.



FDA Cleared  
Class II Medical Device

Defend 400  
Air Cleaning Device

### OBJECTIVE

The objective was to determine whether the Defend 400 air cleaner could reduce airborne bacterial counts as compared to the control (no Defend device) in an urgent care outpatient facility running under normal conditions (occupied by doctors, nurses, staff and patients).

### METHODOLOGY

Enumeration and identification of airborne bacterial species from air samples. The samples were collected using an impaction air sampler, MAS-100 Eco Microbiological Air Sampler (MBV AG, Switzerland). Bacterial counts and bacterial species identification was performed by EMSL Analytical Inc (NJ, USA).

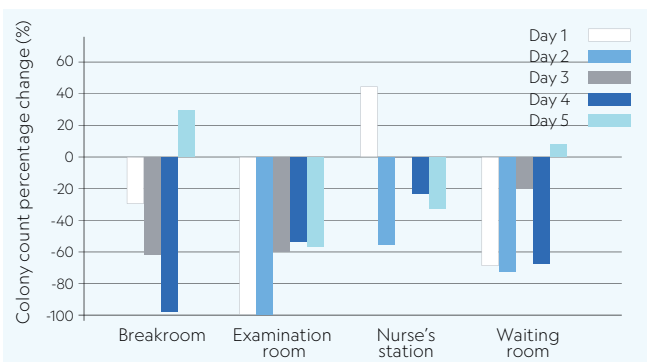
Air samples were taken during two phases: control and test.

- The control phase, without the Defend 400 air cleaner, consisted of air samples taken at each environment for five consecutive days. The control phase established a baseline for the air samples colony counts.
- The test phase, with the use of a Defend 400 air cleaner in each environment, was carried out in a similar fashion on same five consecutive days of the week. During test phase the Defend 400 was set to speed 3, 3 Cubic Meters per Minute (CMM) [184 m<sup>3</sup>/hour]. Note that the device was always ON during the test phase.

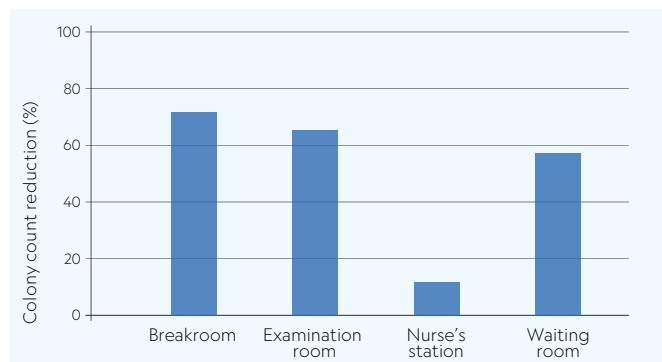
Both, control, and test phase conditions reported comparable overall number of visitors (303 v 306) to the clinic, with same average and median number of visitors per hour (5).

### RESULTS

- Compared to the control, the Defend 400:
  - Significantly (P<0.05) reduced airborne bacteria in the combined four rooms by 52%.
  - In each room, the reduction ranged from 11-72%.

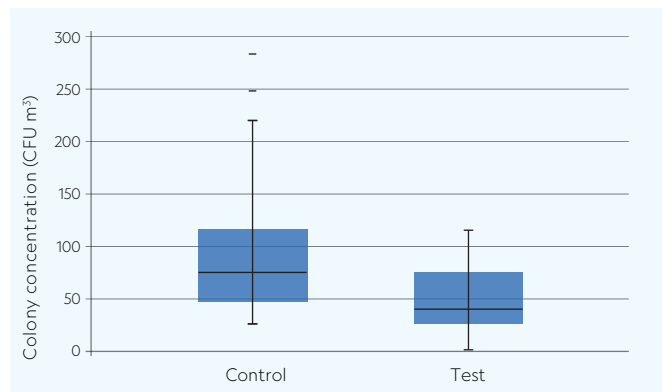


**Fig. 1.** Percentage reduction in colony counts on a day-to-day comparison between control and test data. The comparisons include all control days vs all test days at each of the four locations sampled. Negative percentage values indicate a reduction while positive percentage values indicate an increase in colony counts.



**Fig. 2.** Percentage reduction in colony counts on a per environment comparison between control and test data. The comparisons include the average of multi-day control counts vs the average of multi-day test counts at each of the four locations sampled.

- Overall, there was a 60% reduction in opportunistic pathogens (2980 to 1180 CFU).
  - The most numerous species reduced consisted of *Micrococcus luteus* and *Micrococcus lylae*, which have been associated with a variety of illnesses including meningitis, septic arthritis, endocarditis, chronic cutaneous infections and catheter infections.
- Overall, there was a 43% reduction in pathogenic bacteria (70 to 40 CFU).



**Fig. 3.** Box-Whisker plot of all control and all test data, irrespective of date and environment. Average changes show reduction in bioburden across all locations sampled in the facility.

## CONCLUSIONS AND DISCUSSION

- During the 5 consecutive days, the Defend 400 significantly reduced total bacterial count by 52%, which included a 60% reduction in opportunistic pathogens and a 43% reduction in pathogenic bacteria.
- Because of the reduction in bacteria, the Defend 400 complements existing infection prevention practices such as built-in heating/air conditioning systems, social distancing, hand and surface disinfection, and the use of masks.
- Reduction in airborne pathogens may, in turn, decrease transmission of airborne transmitted infectious diseases at healthcare institutions, although further studies are required to demonstrate this.

## REFERENCES

1. Soberon F, Lawlor L. Evaluation of air cleaner device at an urgent care clinic.
2. <https://novaerus.com/research>.