

CASE STUDY

Air Disinfection and COVID-19 Surveillance Testing

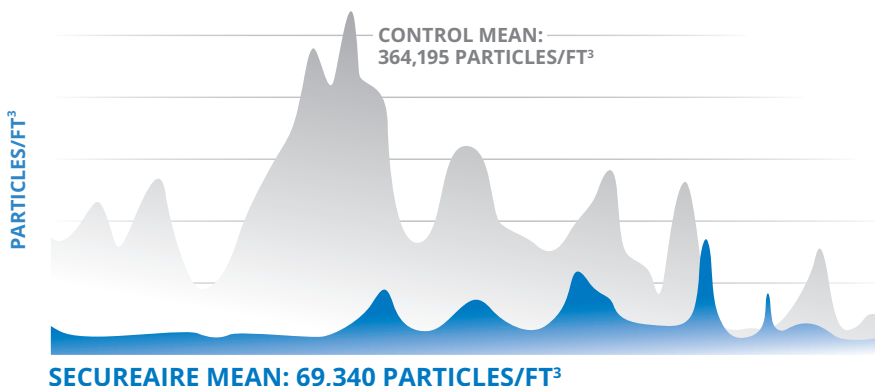
Our lives will never be the same. Our jobs as educators and parents are to advance education within a safe and nurturing environment. Something very difficult this year. We present how one K-12 school remained open all year and safely educated their students with minimal academic interruption by employing SecureAire air purification systems along with improved surface disinfection, hygiene protocols and point-of-care blood testing.

Introduction

More than ever, we understand how sneezing, coughing, speaking, and simply breathing release and disperse droplets and virus particles. Disinfecting these bioaerosols is difficult in any indoor air environment and especially true within a dynamic classroom. **Even social distancing and the six-foot rule are less effective than previously thought.** The airborne pathogens we're all targeting can travel great distances and remain suspended for hours. Aerosols and droplets are subject to a student's thermal plume, human traffic, door movements, electrostatic forces, and to a lesser degree air currents. Evidence now warrants engineering solutions that target airborne transmission of indoor infectious risk.

The AESA Preparatory Academy of Austin, Texas encompasses a three-building campus including 13,000 square feet, 15 indoor classrooms, 8 outdoor classrooms, and 3 large common areas. The school has 127 students and 24 faculty and staff.

ACTIVE Particle Control Reduces Ultra-Fine Particles by 81%

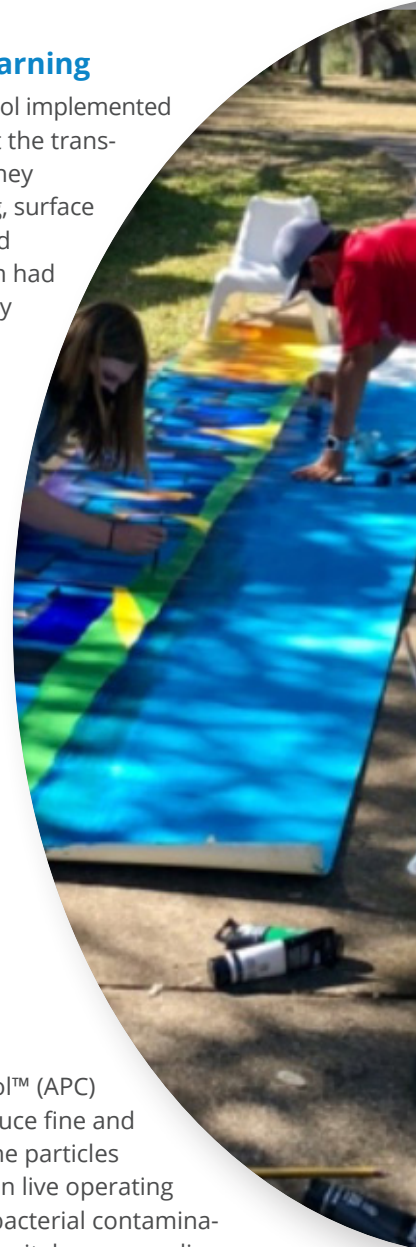


Preparing for In-Person Learning

Prior to in-person teaching the school implemented a multi-modal approach to combat the transmission of the SARS-CoV-2 virus. They employed education, hand washing, surface cleaning, screening upon entry, and isolation measures. Each classroom had surface disinfection supplies readily available. Universal masking for all middle school and high school students was required. Kindergarten and elementary students initially used face-shields and then transitioned to facemasks. To combat breathing-zone disease transmission they installed campus-wide air-disinfection with the SecureAire ACTIVE Particle Control™ (APC) technology. The school also conducted once-a-week on-site SARS-CoV-2 blood antigen surveillance testing. These collective measures and air purification technology enabled the confident opening and continuous operation of the school through graduation.

The Science Behind the Technology

SecureAire's ACTIVE Particle Control™ (APC) technology has been shown to reduce fine and ultrafine airborne particles and pathogens in live operating rooms, reduce bacterial contamination in active hospital compounding pharmacies, and rapidly inactivate or kill the highly resistant anthrax surrogate (*Bacillus subtilis*) [Ereth, *AJIC*, 2020]. This solution has also been shown to reduce health care-associated infections by 45% [Journal of Hospital Infection, October 2021, Ereth, et al].





Additional Protective Measures

The school also deployed a SARS-CoV-2 antigen point-of-care pin-prick blood test (Watmind USA) that was run weekly for all students and campus personnel. The Watmind “biochip” chemiluminescent immunoassay was used for surveillance and not diagnostic purposes. Clinical data was anonymously collected to determine if it was possible to detect the SARS-CoV-2 viral antigen in the blood immediately or a few days after contact exposure yet prior to the subject becoming contagious. Subjects who tested positive for the blood antigen were quarantined until they cleared the antigen.

The entire academic year during the COVID-19 pandemic included 20,828 student days, 4,104 faculty days, and a full schedule of athletic and extra-curricular activities. From August through December four percent of blood antigen tests (55/1280) returned positive with resolution of the blood antigen positivity on average four days later. This blood antigen positivity often occurred in clusters such as with teams after off-campus exposures during sporting events. No confirmed COVID-19 cases were detected on campus for either students or teachers using the once-a-week antigen testing strategy. However, with a break in testing due to an extended Thanksgiving holiday, two confirmed COVID-19 cases were detected in one student and one teacher upon return to campus. They were isolated and quarantined.

Summary

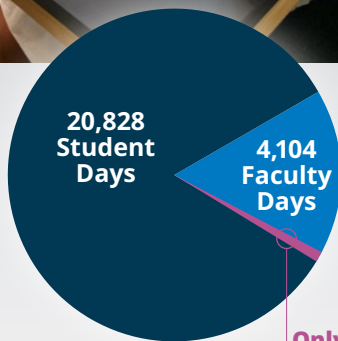
The deployment of a health care engineering and antigen testing tool were critical to the success of the ASEA Preparatory Academy’s COVID-19 strategy. By employing the SecureAire ACTIVE Particle Control™ technology and the Watmind SARS-CoV-2 antigen surveillance test enabled the school to deliver a relatively normal educational experience to students and families for the duration of the academic year.

References

Ereth MH, Hess DH, Driscoll A, Hernandez M, Stamatatos F. Particle control reduces fine and ultrafine particles greater than HEPA filtration in live operating rooms and kills biologic warfare surrogate. *Am J Infect Control* 2020; 48:777-80. <https://10.1016/j.ajic.2019.11.017>.

Ereth M, Fine J, Stamatatos F, Mathew B, Hess D, Simpser E. Health care-associated infection impact with bioaerosol treatment and COVID-19 mitigation measures. *J Hospital Infection*, Oct 2021; [https://www.journalofhospitalinfection.com/article/S0195-6701\(21\)00269-3/fulltext](https://www.journalofhospitalinfection.com/article/S0195-6701(21)00269-3/fulltext)

Ereth M, Wagoner T, Blevins M, Hess D.; Elevator Cabin Disinfection with Active Particle Control, Manuscript under review.



Only one tenth of 1% lost learning days for the entire school year.

“With over 20,000 student days and over 4,000 faculty days the school experienced a loss of on-campus learning days equivalent to one-tenth of one percent (0.1%).”

— Barbara Garza, Head of School,
AESA Prep Academy

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