

# Healthcare

• **“Airborne nosocomial infections have proven to be a persistent and sometimes tragic problem. If transmission by direct contact predominates, as many experts suggest, then surface disinfection technologies should have a major impact in reducing infection rates. But with more than a third of all nosocomial infections possibly involving airborne transmission at some point, the combination of surface and air disinfection should produce optimum results.”**<sup>3</sup>

• **“Various sources estimate that between 2 million and 4 million nosocomial infections occur annually, resulting in 20,000 to 80,000 fatalities. The cost of nosocomial infections in the United States is estimated to be about \$4 billion to \$5 billion annually.”**<sup>3</sup>

• **“Airborne nosocomial infections are transmitted directly or indirectly through air and may cause respiratory (primarily pneumonia) and surgical-site infections”.**<sup>1</sup> The degree to which the transmission of nosocomial infections is airborne is unknown. “One source estimates that **10% of nosocomial infections are airborne**, while another states that **16% of ICU infections result from airborne-pathogen transmission.**”<sup>1 2</sup>

• **“Evidence suggests aerosol transmission through ventilation systems, although the major transmission routes are close proximity airborne droplet infection and close contact infection.”**<sup>4</sup>

• A common finding of recent research is that a significant amount of infectious particles are less than 4 nm in size.<sup>8</sup>

• **Particles of this size can remain suspended in indoor air for long periods of time and be recirculated throughout the building by natural air currents and the HVAC system.**<sup>8</sup>

• **This validates an airborne disease transmission path that is not being adequately addressed by the surface and close-contact precautions being used today.**<sup>8</sup>

• Based on research findings and on ASHRAE’s position, it seems prudent for infection-control professionals and building designers to consider additional control measures for airborne transmission, **in addition** to the precautions already in use when designing new healthcare facilities and updating existing facilities.<sup>8</sup>



• In one university study, **“surgical site infections are the most common type of nosocomial infection at a rate of about 0.1 to 0.3 per 1,000 discharges”.**<sup>5</sup> **“The over all nosocomial rate was 14 percent, with infections rates of 42.5% for the surgical ICU, 19.6% percent for the surgical ward and 4.1% for the medical ward.”**<sup>6</sup>

## MRSA in the Air

• **Many mistakenly assume that systems designed and installed per code will produce sterile air.** **“In a recent study of 24 houses in El Paso, Texas, of Staphylococcus aureus and Antibiotic-Resistant Staphylococcus aureus (MRSA), the average recovered concentration of respirable heterotrophic organisms found outside each home was 345.38 CFU/m<sup>3</sup>, with an average of 12.63 CFU/m<sup>3</sup> for S. aureus. The average recovered concentration of respirable heterotrophic organisms found inside each home was 460.23 CFU/m<sup>3</sup>, with an average of 15.39 CFU/m<sup>3</sup> for S. aureus.”**<sup>7</sup>

**CONCLUSIONS: “This study indicates that antibiotic-resistant bioaerosols are commonly found within residential homes. The results also suggest that resistant strains of airborne culturable S. aureus are present in higher concentrations inside the study homes than outside the homes.”**<sup>7</sup>



Example:  
Genesis Air  
source control  
TTU-UMC  
Medical  
Examiners  
Lab

1 Eickhoff, T.C. (1994). Airborne nosocomial infection: A contemporary perspective. *Infection Control and Epidemiology*, 15, 663-672.

2 Durmaz, G., et al. (2005). The relationship between airborne colonization and nosocomial infection in intensive care units. *Journal of Chemotherapy*, 39, 465-471

3 Kowalski, W.J. (2006).

4 Ho, P.L., Tang, X.P., & Seto, W.H. (2003). Sars: Hospital infection control and admission strategies. *Respirolog*, 8, S41-S45.

5 Mangram, A.J., Horan, T.C., Pearson, M.L., Silver L.C., Jarvis, W.R., & HICPAC. (1999). Guideline for prevention of surgical site infection. *American Journal of Infection Control*, 27, 98-134.

6 Munzinger, J., Buhler, M., Geroulanos, S., Luthy, R., & Graevenitz, A.V. (1983). Nosocomial infections in a university hospital. *Schweiz Med Wochenschr*, 113, 1782-1790.

7 Gandara, A., Mota, L.C., Flores, C., Perez, H.R., Green, C.F., and Gibbs, S.G. (2006). Isolation of Staphylococcus aureus and Antibiotic-Resistant Staphylococcus aureus from Residential Indoor Bioaerosols. *Environmental Health Perspectives*, 114, 12, 1859, 1863.

8 Hodgson, M.M.D., MPH VA, ASHRAE, **Position Document on Airborne Infectious Diseases**, June 24, 2009

## Genesis Air Installations:

- **Federal Law Enforcement Training Center (FLETC)**

*Building 28 Training and Command Center  
Physical Training Building*

- **Joint Reserve 914 Airlift Wing**

*Fire and Crash Rescue Station*

- **Goodfellow AFB**

*Student Pipeline Dormitory  
School Age Facility*

- **El Paso VA**

*Health Care Clinic & Hospital*

- **Grand Junction VA Hospital**

*Grand Junction, Colorado*

- **Big Springs VA Hospital**

*Big Spring, Texas*

- **US Postal Service**

*Sundown, Texas*

- **Laughlin AFB**

*Fuel Systems Building  
PT Training Building*

- **Fort Sam Houston**

*Corp of Engineers Regional Office*

- **Integrated Cancer Center**

*El Paso, Texas*

- **TTUHSC - Medical School**

*El Paso, Texas*

- **Medical Examiner's Office**

*Lubbock, Texas*

- **TTUHSC - Medical School**

*Lubbock, Texas*

- **University of Louisville Hospital**

*Pharmacy Lab Clean Room*

- **Bellevue Elementary School**

*Bellevue, Nebraska*

- **San Francisco Airport T2 Terminal**

*San Francisco, California (In progress)*

- **North East Alabama Medical Center**

*Anniston, Alabama*

**For more information contact:**

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web site: [www.genesisaair.com](http://www.genesisaair.com)



**“As designed and tested the Genesis Air system was able to remove or neutralize better than 98% of the airborne material as it processed the test chamber.”**

Dugway Proving Grounds Western Desert Test Center  
(2006). WDTA-TR-06-078,3.8,33.

### Third Party Testing

U.S. Army Developmental Test Command  
(Dugway Proving Ground)

RTI International

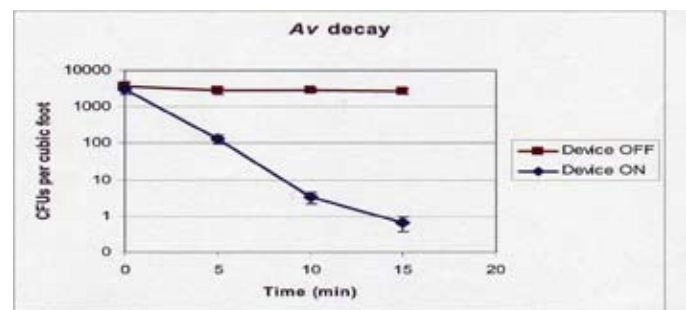
HRA Environmental

G.D. Air Testing

Prism Analytical Technologies

Quality Environmental

Eastmount Environmental Services



*Aspergillus versicolor*

Test Data Courtesy of RTI (2006)



Corp of Engineer's Regional  
Office Fort Sam Houston  
GAP™ Catalyst



El Paso VA  
Surgical Floor