



# Airborne Contamination Control through Directed Airflow in the Exam Room: A Pilot Study Using a Membrane Diffuser

## AUTHOR(S)

*Debajyoti Pati\*<sup>1</sup>, Michael P. Pietrzak<sup>1</sup>, David Duthu<sup>2</sup>, Ting-Kwo George Lei<sup>3</sup>, David Vincent<sup>1</sup>, Tom Franklin<sup>2</sup>, Thomas E. Harvey, Jr. <sup>1</sup>, and Troy Ransdell<sup>1</sup>*

*1HKS Architects, 1919 McKinney Avenue, Dallas, TX*

*2CCRD Partners, 808 Travis Street Suite 200, Houston, TX*

*3Fluid Dynamics Solutions, Inc., 12453 S.E. Mountain Sun Lane, Clackamas, OR*

## ABSTRACT:

Airborne infections have been documented as a major source of hospital acquired infection - one of the major concerns in healthcare delivery. An important factor contributing to airborne infection is cross contamination through air particulate dispersion as affected by the ventilation system design. Clean room technology (with membrane ceiling) has been successfully used in technology and pharmaceutical industries to control airborne contamination. This study examined the performance of membrane ceiling technology in controlling air particulate dispersion in a mock-up exam room. It included both performance tests in a mock-up room and a simulation study of six different ventilation system designs using Computational Fluid Dynamics (CFD) analysis. Findings suggest that a membrane diffuser directed airflow ventilation strategy occupying approximately 20% to 30% of the ceiling surface and placed over the patient in a contemporary sized exam room provides a less turbulent airflow pattern and less mixing of the air between the patient and others in the room.

Keywords: membrane ceiling; HVAC system; emergency department; infection control

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Email: [dpati@cadrerresearch.org](mailto:dpati@cadrerresearch.org)

For a personal copy of this article please contact:

Debajyoti Pati at [dpati@hksinc.com](mailto:dpati@hksinc.com)