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Combined experimental and computational investigation of sterile air flows in surgical environments[1] JAMES MCNEILL, JEAN HERTZBERG, ZHIQIANG ZHAI, University of Colorado — Surgical environments in hospitals utilize downward, low-turbulence, sterile air flow across the patient to inhibit transmission of infectious diseases to the surgical site. Full-scale laboratory experiments using particle image velocimetry were conducted to investigate the air distribution above the patient area. Computational fluid dynamics models were developed to further investigate the air distribution within the operating room in order to determine the impact of ventilation design of airborne infectious disease pathways. Both Reynolds-averaged Navier-Stokes equations and large eddy simulation techniques are currently being used in the computational modeling to study the effect of turbulence modeling on the indoor air distribution. CFD models are being calibrated based on the experimental data and will be used to study the probability of infectious particles entering the sterile region of the room.

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