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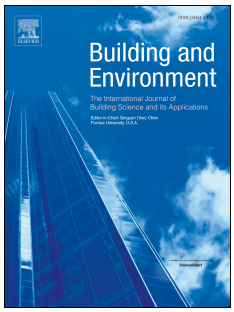

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Influence of opening and closing process of sliding door on interface airflow characteristic in operating room

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ABSTRACT

Indoor air environment inside operating room (OR) is crucial for the success of surgical operation. The opening and closing process of sliding door is very common in OR. In this case, the designed positive pressure will disappear. Since the air exchange characteristic at the interface of the sliding door will influence the Surgical Site Infection risk, the combined effects of temperature and pressure differences on interface airflow along with the air infiltration volume and intruding particles caused by the airflow are studied by theoretical and numerical methods. Two different cases are compared, where the temperature of OR is lower or higher than that of anteroom, respectively. Results show that the contaminants accumulate in the upper space of the OR due to the airflow pattern between two rooms when the temperature of OR is lower than the anteroom. This will increase the possibility that airflow carrying contaminants intrudes into OR. On the contrary, the contaminants are controlled in the lower space of the OR when the temperature of OR is higher than that of anteroom. On average, the particle intrusion ratio of the second case decreases by 55% compared with that of the first case. So, it is helpful to protect the clean environment of OR when the temperature of OR is higher than that of the anteroom. Moreover, the air infiltration volume of the closing phase is found unequal to that of the opening phase. This study provides the useful information for maintaining a clean indoor environment under operational condition.

Keywords: clean operating room, temperature difference, pressure difference, airborne particle, sliding door, numerical simulation