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Nielsen, Peter V.; Polak, Marcin; Jiang, Hao; Li, Yuguo; Hua, Qian

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Cross Infection between two People in Hospital Beds with Integrated Personalized Ventilation

Peter V. Nielsen, Marcin Polak, Hao Jiang, Yuguo Li and Qian Hua

Aalborg University
Denmark

Abstract

Normally we protect ourselves from cross infection by supplying fresh air to a room by a diffuser, and this air is distributed in the room according to different principles such as: mixing ventilation, displacement ventilation, vertical ventilation, etc.

However, there is a possibility to supply air direct to the breathing zone when people are lying in beds, as in a hospital ward, and therefore to supply a much smaller amount of air. This principle, called "Personalized Ventilation" has shown to be very efficient in the protection of people from cross infection.

The system will simply supply fresh air into the breathing zone through a pillow or a blanket. The system can also be used to reduce the emission from a source patient. The air supplied from the personalized ventilation (PV) diffuser rises to the ceiling and with a sufficient air distribution system it can be removed from the room.

The experiments are carried out with tracer gas and two thermal manikins in the SARS ward at Hong Kong University. One of the manikins is the source manikin, and the other one the target. The measurements and CFD predictions show that a very high degree of protection can be obtained with the system. Optimum temperature of the supply air is also addressed in this research.