evaporate rapidly to form nuclei that can remain airborne for many hours.[2] It is unclear from Kao and Yang's work whether or not the movement of these larger droplets was simulated. Being relatively heavy, the effect of room air currents on these larger droplets is much less than that on droplet nuclei, and they tend to be removed from the air by gravitational deposition. They are nonetheless of considerable importance as a number of infections, including severe acute respiratory syndrome, are known to be transmitted by the droplet route. In order to protect HCWs in regions close to the patient, it is necessary to ensure that they are not exposed to these larger respiratory droplets. We would therefore encourage Kao and Yang to consider this issue in their future work.

Notwithstanding our comments above, we believe that computational fluid dynamics is an important tool in analysing the spread of airborne infection. Indeed, our own analysis suggests that the positioning of supply diffusers and extract grilles can have a profound effect on the movement of infectious particles within isolation rooms, and that careful positioning of these can lead to significant improvements.[3]

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Available online 10 July 2006

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doi:10.1016/j.jhin.2006.05.009

Safe zone in isolation rooms

Madam,

We appreciate the comments of Profs Beggs and Kerr on our work, the main purpose of which was to understand how different airflow patterns affect virus diffusion in isolation rooms.[1] In practice, the risk of virus dispersal is controlled not only by airflow patterns but also by other factors, such as contagious transmissions, changing airflow directions caused by people moving or doors opening, and other hazardous situations including carrying the virus, etc. In our investigation, we simplified the airflow model for the analysis of virus dispersal in isolation rooms by assuming the following to be the normal situation: (1) closed doors; and (2) air flow maintained in a stable state without any movement of people. In our investigation, only coughs producing larger droplets ($\approx 30\ \mu m$) were considered for the requirements of isolation rooms used for non-airborne diseases, e.g. severe acute respiratory syndrome. However, the results provided reasonable physical evidence that the appropriate airflow patterns with suitable operating parameters, e.g. 12 air changes/h, which dominates the average velocity inside the isolation rooms, can create a relative safe zone for staff. The value of 12 air changes per hour is determined by engineering experiments and specified in our national specifications (CDC of Taiwan) for the installation of hospital ventilation systems. In addition, our proposed computational fluid dynamics (CFD) technique is a simple and readily available method for analysing the air within isolation rooms that are subject to coughs producing larger droplets.

Furthermore, in our opinion, CFD still has some difficulty in simulating realistic cases of airborne diseases, such as a cough that produces smaller droplets. Realistic simulations would require complex conditions and physical models, and would be restricted by limitations of numerical models for various situations inside the isolation rooms, e.g. the effect of evaporation for droplets, a long-time computational model for tracing each nucleus (micro-particles), and the problems of mathematical instability for the CFD techniques. The physical mechanism for droplet nuclei drying out during the transition of virus dispersal by airflow patterns inside the isolation rooms is not clear. For coughs producing smaller droplet nuclei, we suggest that alternative approaches are more suitable, i.e. tracer containment testing.[2,3]

As suggested by Profs Beggs and Kerr, in order to mark out the relative safe zone inside an isolation

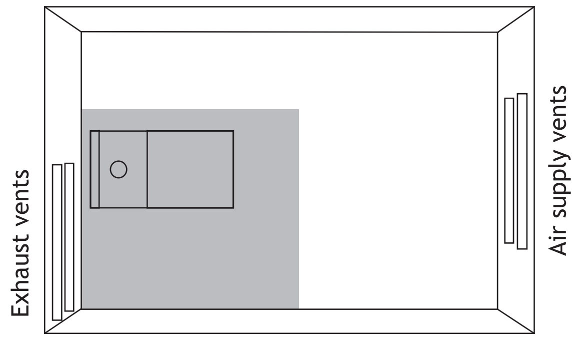

Figure 1 The top view of the relative hazardous zone on the floor for Model VC-07.

room, the fraction of relative hazardous zone (FHZ) is defined as:

$$\text{FHZ} \equiv \frac{\text{Area of Relative Hazardous Zone on Floor}}{\text{Total Area of Floor}} \times 100\% \quad (1)$$

The area of the relative hazardous zone is defined as the possible locations where the larger droplets ($\approx 30\ \mu$m) may fallout on to the floor inside an isolation room. Based on the definition of FHZ, the fraction of relative safe zone (FSZ) can be calculated by FSZ = (100% − FHZ). The computed values of FHZ for models investigated in our work were: (1) FHZ = 58.7% for VC-01; (2) FHZ = 46.0% for VC-02; (3) FHZ = 76.5% for VC-03; (4) FHZ = 61.5% for VC-04; (5) FHZ = 61.7% for VC-05; (6) FHZ = 46.2% for VC-06; and (7) FHZ = 36.8% for VC-07.[1] The safest zones were in the area near the air supply vents for each airflow pattern.[1] Model VC-07 (Figure 1) demonstrated the smallest relative hazardous zone of droplet fallout and virus diffusion of coughed gas. This particular ventilation arrangement provides the best results for controlling the dispersal of virus droplets, and provides a relative safe zone for staff performing their duties inside isolation rooms.

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doi:10.1016/j.jhin.2006.05.008

Possible hazards of hypochlorite disinfection for feeding equipment for premature infants

Madam,

When referring to breast milk collection kits for neonatal units, Shetty *et al*. comment that, 'used appropriately, hypochlorite solution is adequate for disinfection'.[1] Although we agree with this statement and recognize that hypochlorite disinfection has been in use since the 1950s, we also recommend review of the possible hazards of this method for equipment involved in feeding premature infants. The particular concern for the present-day neonatal population comes from their increased vulnerability to gastrointestinal insults. Concentration-dependent toxicity has been described following the use of hypochlorite on skin.[2]

A questionnaire on disinfection of equipment associated with infant feeding revealed that 48 out of 71 (68%) UK neonatal units did not attempt to wash off the hypochlorite prior to use.[3] This is in accordance with some manufacturers' instructions. Nearly 90% of the units reported using hypochlorite disinfection at some stage; 61% for breast pump equipment and 77% for premature infant dummies, which are too expensive for disposal every time they are used. These articles were soaked in hypochlorite during the infant's stay, and discarded or sent to the hospital sterile services department on discharge. For bottles and teats, chemical disinfection was reported in 37% and 34% of units, respectively.

We carried out a pilot study to examine the possible effect on the infant gut mucosa of not rinsing off these disinfectants. Caco2 cells were used. These are an immortal cell line with the