High negative pressure limits dispersion of airborne contaminants in hospitals and renovation sites
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Maintaining a high negative pressure in airborne infection isolation rooms of hospitals (over -10 Pa) and in renovation sites (over -5 Pa) effectively limits the dispersion of airborne contaminants and dust, a new study from the University of Eastern Finland shows.

Inhaled airborne particles at work can cause adverse health effects, and this is why it is important to prevent exposure to them. Moreover, the control of contaminants released from internal sources within an enclosed workspace also plays an important role in protecting other persons working in or occupying adjacent areas from adverse biological and chemical exposure.

"In practice, however, the dilution is not effective enough—at least not in the anterooms we studied. Generally, a health care worker does not stay in the anteroom for more than 2-3 minutes. To achieve at least 90% contaminant removal, the minimum air change rate requirement of 40 1/h would be needed after entering the anteroom. This would enhance the total containment of an AIIR," Early Stage Researcher Anna Kokkonen from the University of Eastern Finland explains.

Local exhaust ventilation is important in renovation sites

The dust containment capability of renovation sites was studied by measuring pressure differences and dust concentrations (filter samples and real-time monitoring) simultaneously from the renovation sites and their adjacent areas. The researchers also investigated the effect of using on-tool local exhaust ventilation on limiting the dispersion of dust, and they studied the efficiency of a short-term water misting method in airborne particle removal.
The method was applied after the work was completed to limit the dispersal of airborne dust that had not been captured in real-time by source controls.

The results indicate that maintaining a continuous negative pressure over -5 Pa limits the dispersion of dust outside a renovation site. Enclosure containment was achieved by sealing the junctions between the temporary and existing partitioning structures to obtain better airtightness and by building an airlock between the enclosure and adjacent areas. Although the renovation sites studied were at times under positive pressure, no dust dispersion outside an enclosure was observed, when the mean target concentrations at the renovation sites remained.


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