Post-flood measurement of fungal bioaerosol in a resource-limited hospital setting: Can settle plate method be used?

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Objectives: Measurement of fungal bioaerosol (FB) is critical to guide decontamination interventions and reopening of hospital units after flooding. The preferred microbiological air sampler method (MAS) is costly and unavailable in resource-limited settings.

Methods: The settle plate method (Plate) and MAS were used simultaneously for post-flood FB assessment at a tertiary-care hospital in Thailand. Correlations between Plate and MAS were analyzed and adjusted for various hospital unit characteristics. Performance of Plate was assessed using MAS as a standard reference.

Results: A total of 38 hospital units were examined; 16 were open-ventilation units and 22 were closed-ventilation units. Compared to closed-ventilation units, open-ventilation units had significantly higher median temperature (27.6°C vs. 25.9°C), patient load (52.0 vs. 4.0 patient-days), and FB level by Plate on day 3 and day 5 of incubation (270 vs. 90 colony-forming unit (CFU)/m³ and 420 vs. 180 CFU/m³, respectively). By multivariate linear regression analysis, the results by Plate were positively correlated with the results by MAS on day 3 and day 5 of incubation (adjusted coefficient = 1.60, P<0.001 and adjusted coefficient = 1.49, P=0.002, respectively) in only the open-ventilation units. The Plate results on day 3 had the highest sensitivity (83.3%) and specificity (80.0%) for identifying open-ventilation units with unacceptable FB (>500 CFU/m³).

Conclusions: The Plate method may be used for post-flood measurement of FB in resource-limited settings where MAS is not feasible. Our findings suggest test utility was limited to open-ventilation units where pattern of airflow may be optimized and facilitate deposition of mold spores.

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