



## LETTERS TO THE EDITOR

### Routine sampling of air for fungi does not predict risk of invasive aspergillosis in immunocompromised patients

Madam,

Falvey and Streifel noted that routine sampling of the air for fungi should not be used for predicting the risk of invasive mould infections in immunocompromised subjects.<sup>1</sup> We concur with their findings and wish briefly to relate our observations over a seven-year period which adds substantial support to their paper.

In response to an outbreak of invasive aspergillosis (IA) in haematopoietic stem cell transplant (HSCT) patients that was temporally related to hospital construction, we initiated a routine air sampling programme.<sup>2</sup> From January 1992 until April 1999, weekly quantitative fungal cultures were performed from two sites in the corridors of a 25-bed HSCT unit. The rooms in the HSCT unit were maintained at positive pressure compared to adjacent areas and the air was HEPA-filtered. Air sampling for fungi was performed with an Andersen N6 single-stage microbial air sampler (Andersen, Atlanta, GA, USA) using Sabouraud dextrose agar. Plates were incubated for seven days at 25 °C and moulds were identified to the genus level. All cases of IA during the study period were prospectively identified and defined as proven cases using consensus criteria.<sup>3</sup> Overall, 978 air cultures were performed with 0.566 m<sup>3</sup> of air sampled at each time point. *Aspergillus* spp. were recovered from 163 (16.7%) of the air samples. Of air cultures yielding *Aspergillus* spp., the quantitative results ranged from 1.8 colony-forming units (cfu)/m<sup>3</sup> to 28.3 cfu/m<sup>3</sup>. Forty-seven (4.8%) of the samples yielded  $\geq 5$  cfu/m<sup>3</sup> of *Aspergillus* species. Other non-*Aspergillus* spp. of fungi, predominantly *Penicillium* spp., *Cladosporium* spp. and *Alternaria* spp., were detected in 567 of the air cultures (58%). Forty-five proven cases of IA were defined during the study period, which encompassed 57 190 patient-days (0.80 IA/1000 patient-days). The rate of IA was 2.29% and 0.36%

for allogeneic and autologous HSCT patients, respectively.

If the air cultures were predictive of the development of IA then one would expect to observe an association between positive cultures and subsequent IA. To test this premise, we analysed the cases of IA that occurred in the 14-day and 28-day time periods following quantitative air cultures for *Aspergillus* spp. with values  $>15$  cfu/m<sup>3</sup> and between 5 and 15 cfu/m<sup>3</sup> compared with 100 time periods when the test results were negative for *Aspergillus* spp.

The 14-day and 28-day time periods were chosen because of the variable incubation period for IA. There were 28 and 19 air samples with quantitative *Aspergillus* spp. results of 5–15 and  $>15$  cfu/m<sup>3</sup>, respectively. The proportion of periods in which a case of IA was diagnosed in the 14 days immediately following a test result of no aspergillus, 5–15 and  $>15$  cfu/m<sup>3</sup> was 13%, 15% and 17%, respectively ( $P=0.80$ ; Fisher's exact test). For the 28-day follow-up period, the proportion of periods in which IA was defined was 19%, 24% and 30%, following test results of 0, 5–15 and  $>15$  cfu/m<sup>3</sup>, respectively ( $P=0.29$ ; Fisher's exact test).

Therefore, although there was a slight trend in the 28-day follow-up period, routine weekly quantitative air cultures did not appear to be helpful in predicting the risk of development of IA in the subsequent 14-day and 28-day time periods.

These data give support to the overall conclusion of Falvey and Streifel.<sup>1</sup> However, several limitations of our analysis must be considered. Cultures were performed on a weekly basis and did not reflect exposure levels at other times. Burst phenomena have been described in which an accumulation of fungal spores is dispersed due to an event.<sup>4</sup> Routine sampling would not be likely to detect a burst phenomenon. Additionally, cultures were performed in the corridors outside the patients' rooms and would not reflect exposure in other areas of the HSCT unit. Although patients rarely travelled outside the HSCT unit, cultures were not performed to assess the levels of *Aspergillus* spores outside the HSCT unit. Environmental

surface cultures and cultures of the water were not performed. Both of these sources have been implicated in transmission of *Aspergillus*.<sup>5,6</sup> An additional limitation of utilizing routine cultures to assess the risk of development of IA is the inherent time delay between culture collection and having results. There is typically a delay of 5–7 days before a potential exposure is defined which may be too late to intervene in the disease progression and is inadequate for intervention to prevent exposure.

For these reasons, we discontinued routine air sampling for mould at our institution. Instead, emphasis is now placed on maintenance of the ventilation system and the physical integrity of the HSCT unit, as well as environmental cleanliness. Great effort is expended, during hospital renovation, to provide physical barriers between construction zones and patient care areas and to maintain negative air pressure in construction zones. In recent months, air quality is monitored via particulate counting which may serve as a surrogate marker for airborne microbes.<sup>7,8</sup> Efforts are ongoing to improve the correlation between particulate counts and fungal spore counts and to better understand how particulate monitoring can be used to predict the risk of mould infection and to monitor air quality.

#### Conflict of interest statement

None declared.

#### Funding sources

None.

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Available online 15 January 2008

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doi:10.1016/j.jhin.2007.11.017

#### A useful clinical approach to community-acquired methicillin-resistant *Staphylococcus aureus* (CA-MRSA) infections

Madam,

I read with interest the article by Millar *et al.* on difficulties with community-acquired methicillin-resistant *Staphylococcus aureus* (CA-MRSA) terminology.<sup>1</sup> Their excellent review contains much