

## Purpose

- Reports of outbreaks of invasive fungal infections due to fungal contamination of hospital water have been documented. However, water safety and quality regulations commonly use bacterial parameters as indicators.
- Therefore, water distribution systems of Lagos University Teaching Hospital and Hostels of the College of Medicine, University of Lagos, were assessed for fungal contamination.

## Methodology

- Water samples were collected from hostels and hospital units categorized into; (1) High risk (Theatres, ICUs, Renal Dialysis Centre, CSSD unit); (2) Medium risk (Acute Stroke unit, Accidents and Emergency unit) and (3) Low risk unit (Wards, Children emergency unit).
- Representative samples were taken from taps, showers heads, faucets and water storage tanks in the hospital and hostels.
- The membrane filtration method for water analysis was used. 100 mL of water sample was filtered through 0.45µm pore size, 47mm diameter membrane filter. Filters were placed on SDA plates supplemented with gentamycin and chloramphenicol.
- Plates were incubated at room temperature and at 37°C. Pure colonies from subculture were identified using microscopic and colony morphology. Isolates that could not be identified were stored away for future molecular identification.



## Results

All (100%) water samples analysed in this index study contained fungal contaminants. A total of 230 isolates were documented of which 31 species of fungi were identified.

**Table 1: Distribution of fungi species isolated from water samples**

Fungi isolated	Frequency of isolation		Total
	Hospital areas	Hostel areas	
<i>Aspergillus fumigatus</i>	12 (5.2%)	6 (2.6%)	18 (7.8%)
<i>Aspergillus flavus</i>	10 (4.4%)	6 (2.6%)	16 (7.0%)
<i>Aspergillus niger</i>	10 (4.4%)	6 (2.6%)	16 (7.0%)
<i>Aspergillus terreus</i>	5 (2.2%)	2 (0.9%)	7 (3.0%)
<i>Aspergillus versicolor</i>	2 (0.9%)	0 (0.0%)	2 (0.9%)
<i>Bipolaris</i> spp	8 (3.5%)	1 (0.4%)	9 (3.9%)
<i>Candida albicans</i>	11 (4.8%)	5 (2.2%)	16 (7.0%)
<i>Cephalosporium curtipes</i>	6 (2.6%)	0 (0.0%)	6 (2.6%)
<i>Chaetomium globosum</i>	1 (0.4%)	1 (0.4%)	2 (0.9%)
<i>Cladosporium</i> spp	11 (4.8%)	3 (1.3%)	14 (6.1%)
<i>Cladophialophora</i> spp	0 (0.0%)	1 (0.4%)	1 (0.4%)
<i>Cunninghamella</i> spp	2 (0.9%)	0 (0.0%)	2 (0.9%)
<i>Curvularia</i> spp	0 (0.0%)	0 (0.4%)	1 (0.4%)
<i>Candida tropicalis</i>	10 (4.4%)	6 (2.6%)	16 (7.0%)
<i>Geotrichum</i> spp	2 (0.9%)	0 (0.0%)	2 (0.9%)
<i>Mucor</i> spp	5 (2.2%)	0 (0.0%)	5 (2.2%)
<i>Neoscytalidium</i> spp	5 (2.2%)	4 (1.7%)	9 (3.9%)
<i>Nocardia</i> spp	1 (0.4%)	0 (0.0%)	1 (0.4%)
<i>Pseudoallescheria boydii</i>	4 (1.7%)	0 (0.0%)	4 (1.7%)
<i>Penicillium chrysogenum</i>	4 (1.7%)	1 (0.4%)	5 (2.2%)
<i>Penicillium glabrum</i>	9 (3.9%)	2 (0.9%)	11 (4.8%)
<i>Penicillium marneffei</i>	2 (0.9%)	0 (0.0%)	2 (0.9%)
<i>Paecilomyces</i> spp	12 (5.2%)	1 (0.4%)	13 (5.7%)
<i>Penicillium</i> spp	10 (4.4%)	4 (1.7%)	14 (6.1%)
<i>Rhizopus stolonifer</i>	6 (2.6%)	2 (0.9%)	8 (3.5%)
<i>Rhodotorula</i> spp	7 (3.0%)	5 (2.2%)	12 (5.2%)
<i>Rhizoctonia solani</i>	2 (0.9%)	2 (0.9%)	4 (1.7%)
<i>Saccharomyces cerevisiae</i>	2 (0.9%)	0 (0.0%)	2 (0.9%)
<i>Trichoderma viride</i>	2 (0.9%)	0 (0.0%)	2 (0.9%)
<i>Candida</i> spp	0 (0.0%)	1 (0.4%)	1 (0.4%)
Other molds	9 (3.9%)	2 (0.9%)	11 (4.8%)
Total	170(73.9%)	60(26.1%)	230(100.0%)

## Conclusion

- The absolute rates recorded in this index study points to water as a plausible source of infections in hospitals which in most cases are often neglected with regards to fungi, due to paucity of reports of outbreaks of waterborne fungal infections.
- The abundance of *Aspergillus* species highlights risk of aspergillosis, while those of the order mucorales indicate a possible source of mucormycosis in the hospital.
- A standard protocol for monitoring and regulation of fungi in water needs to be developed particularly for hospitals as a means of infection prevention and control.

## Selected References

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