



Advancing Worker Health Protection

9th - 13th June | Aviva Stadium | Dublin

Assessing Fungal Burden and Its Implications for Health in an Elderly Care Centre: A Comprehensive Study

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Introduction

Protection thresholds and reference conditions for indoor air pollution, in commercial and service buildings and assessment methodology, **leaving Elderly Healthcare facilities neglected for such parameters.**

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SAÚDE E AMBIENTE E AÇÃO CLIMÁTICA

Portaria n.º 138-G/2021

de 1 de julho

Sumário: Estabelece os requisitos para a avaliação da qualidade do ar interior nos edifícios de comércio e serviços, incluindo os limiares de proteção, condições de referência e critérios de conformidade, e a respetiva metodologia para a medição dos poluentes e para a fiscalização do cumprimento das normas aprovadas.

WHO Fungal Priority Pathogens List (WHOFPL) released recently





Study Objective

- To assess fungal burden in an elderly care centre and its implications for health
- Target Groups:
 - Workers
 - Elderly residents





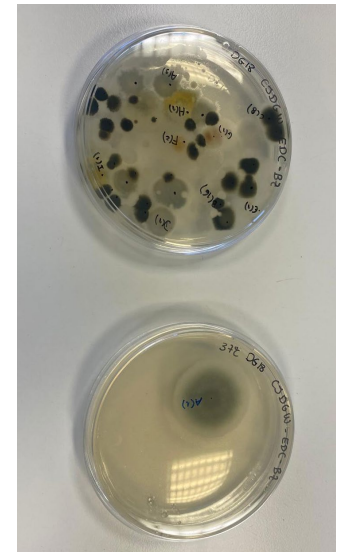
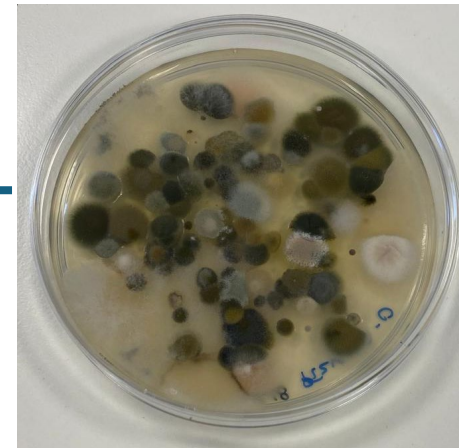
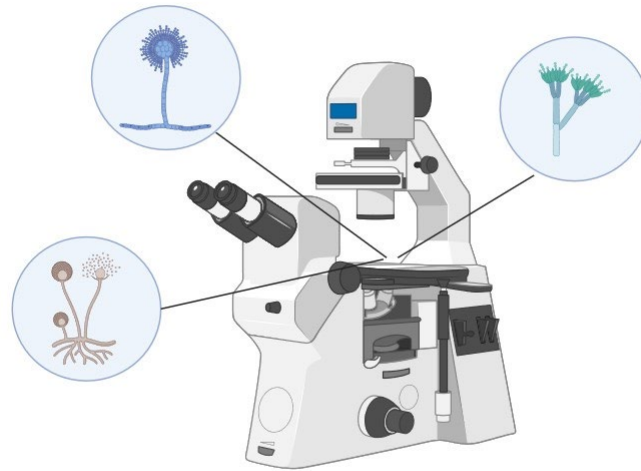
Methodology

Sampling Period:
Two campaigns (2022 and 2023)

Sample Collection
Air samples

Analytical Methods:

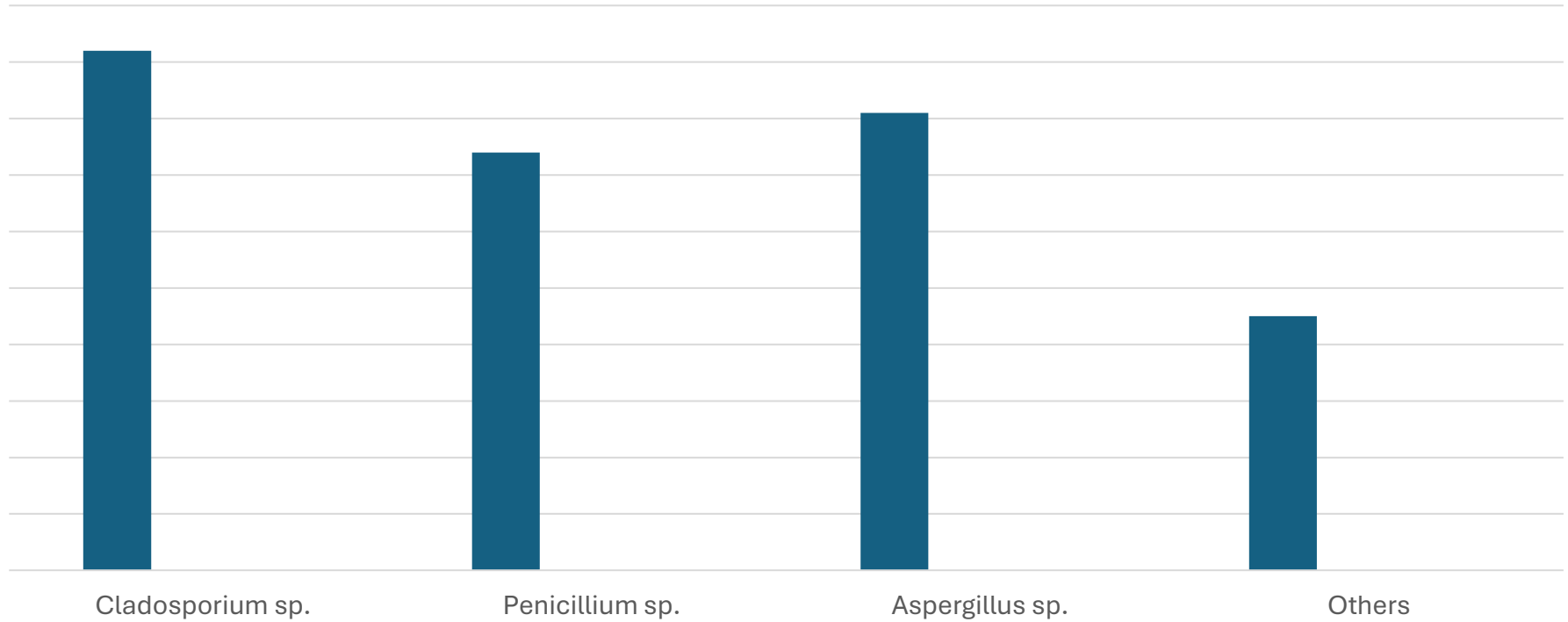
Culture-based methods: malt extract agar (MEA) with chloramphenicol and dichloran-glycerol agar (DG18) (27°C for 5-7 days)





Fungal Contamination Characterization

Most prevalent species



- On both MEA and DG18 from 2022 and 2023

Results - 2022 Campaign

Aspergillus sections Diversity:

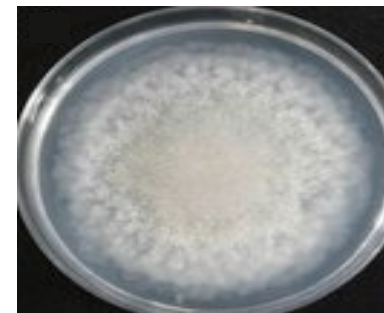
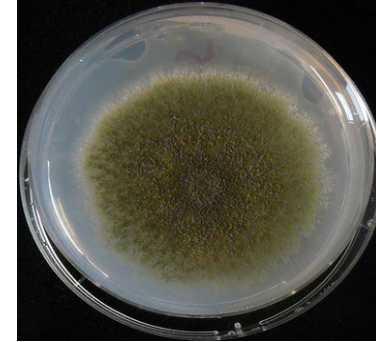
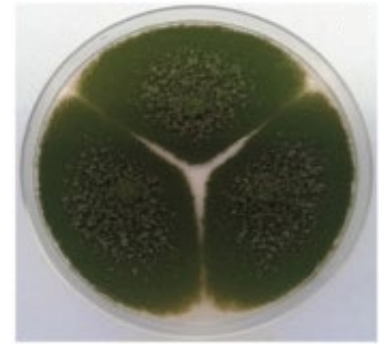
- 5 sections identified

Most Prevalent Sections:

- MEA: *Flavi* (62.5%)
- DG18: *Circumdati* and *Nidulantes* (41.67%)

Priority Fungal Pathogens Detected:

- *Aspergillus* section *Fumigati* (1.00×10^1 CFU.m⁻³)
- *Mucor* sp. and *Rhizopus* sp. (1.00×10^1 CFU.m⁻³)



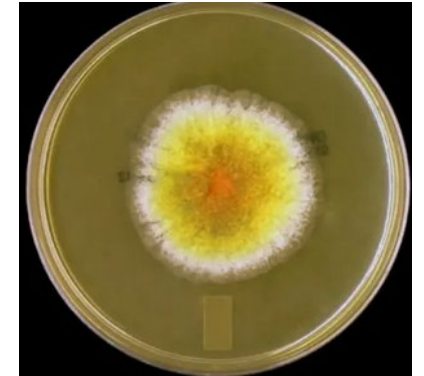
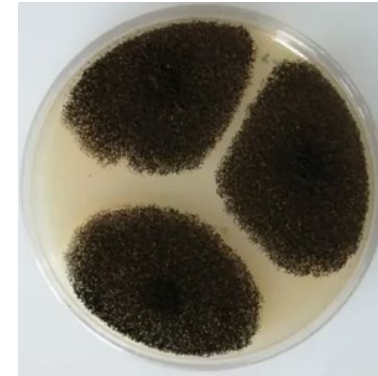
Results - 2023 Campaign

Aspergillus sections Diversity:

- 3 sections on DG18

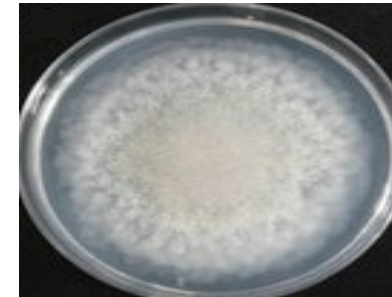
Most Prevalent Sections:

- MEA: *Nigri* (60%)
- DG18: *Aspergilli* (41.67%)



Priority Pathogens Detected:

- *Mucor sp.* and *Rhizopus sp.* (2.00×10^1 CFU.m⁻³)



Comparison of Campaigns

Diversity Change:

- Decrease in *Aspergillus* sections diversity on DG18



Diversity decrease on DG18 between sampling campaigns (2022: 5 sections on DG18) and (2023: 3 sections on DG18).

Shift in Prevalence:

- From *Flavi* (2022) to *Nigri* (2023) on MEA
- Consistent presence of *Mucor* sp. and *Rhizopus* sp.

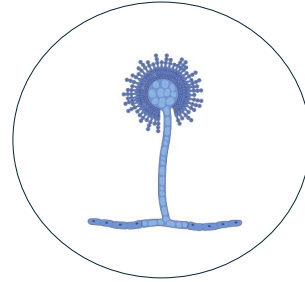


The most prevalent sections in 2022 campaign were *Flavi* on MEA (62.5%) and *Circumdati* and *Nidulantes* on DG18 (41.67%), whereas in 2023 most prevalent section was *Nigri* on MEA (60%) and *Aspergilli* on DG18 (41.67%).



Health Implications For Workers and Elderly:

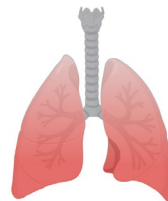
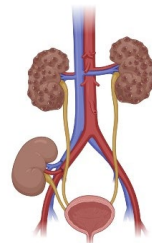
Aspergillus fumigatus (High Priority Pathogen):



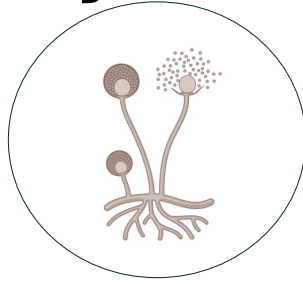
Disease Association: Can cause invasive aspergillosis, particularly in immunocompromised individuals.

Risks for Elderly: Higher susceptibility due to weakened immune systems, potential for severe respiratory issues.

Risks for Workers: Prolonged exposure may lead to respiratory problems, allergic reactions, and potential for invasive infections in those with underlying conditions.



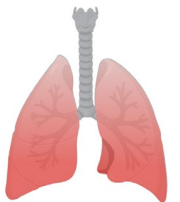
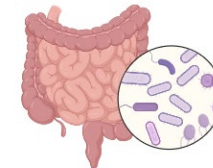
Mucor sp. and Rhizopus sp. (Critical Priority Pathogens):



Disease Association: Cause mucormycosis, a severe fungal infection.

Risks for Elderly: Extremely high mortality rate in immunocompromised patients, risk of rapid disease progression.

Risks for Workers: Like elderly, with increased risk in those with diabetes, cancer, or those who have undergone transplants. High vigilance required for early detection and treatment.



Overall Impact

Occupational Health and Patient Safety:

- Increased need for stringent hygiene protocols.
- Regular environmental monitoring to detect and mitigate fungal presence.
- Awareness programs for staff and residents on the importance of early symptom detection and prompt medical attention.

Preventive Measures - Environmental Controls:

- Adequate ventilation.
- Regular cleaning and disinfection protocols.
- Maintenance of HVAC systems to reduce spore dissemination





Conclusion

•Significant Fungal Burden:

•The study identified a substantial presence of fungal contaminants.

•**Priority Pathogens Detected:** Notable presence of high and critical priority fungal pathogens such as *Aspergillus fumigatus*, *Mucor*, and *Rhizopus*, highlighting potential health risks.



Recommendations

•Continued Monitoring and Assessment:

- Conduct routine air sampling to monitor fungal contamination levels.
- Analyse results systematically to track trends and identify emerging risks.

•Implement Safety Protocols in Elderly Care Centres:

- Environmental Controls
- Hygiene Measures
- Protective Equipment
- Health Surveillance
- Education and Training




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