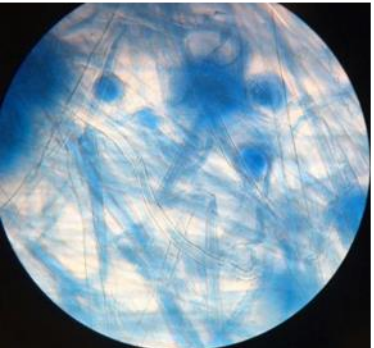
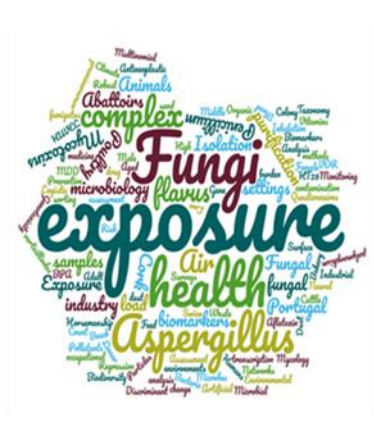


## EXPOSE

# Establishing protocols to assess occupational exposure to bioburden in clinical environments

C. Viegas\*, B. Almeida, A. Monteiro, I. Paciência, J. Rufo, S. Viegas





Active and passive sampling methods have been used to characterize occupational exposure to viable bioburden.

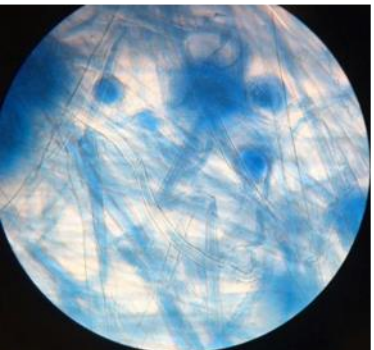
(Reponen in Viegas et al. 2018)

Personal or stationary sampling of airborne bioburden can be performed to quantify exposure by inhalation, but may be influenced by environmental variables, such as seasonal variation and ventilation.

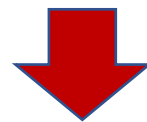
(Flannigan 1997).

Whereas passive-collection methods allow the collection of contamination over a longer period (days, weeks or several months), air samples can only reflect the load of a shorter period (mostly minutes) corresponding to the sampling duration.

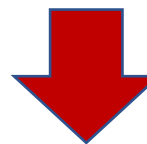
(Badyda et al. 2016; Viegas et al. 2018b)



Passive and active methods used in parallel

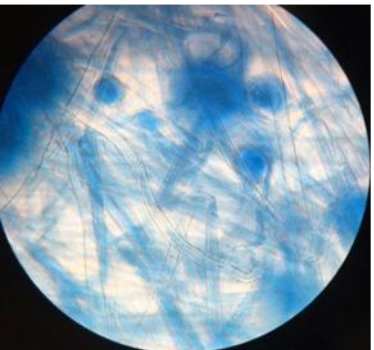


More precise assessment of occupational exposure to bioburden



More accurate risk characterization

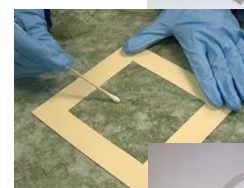
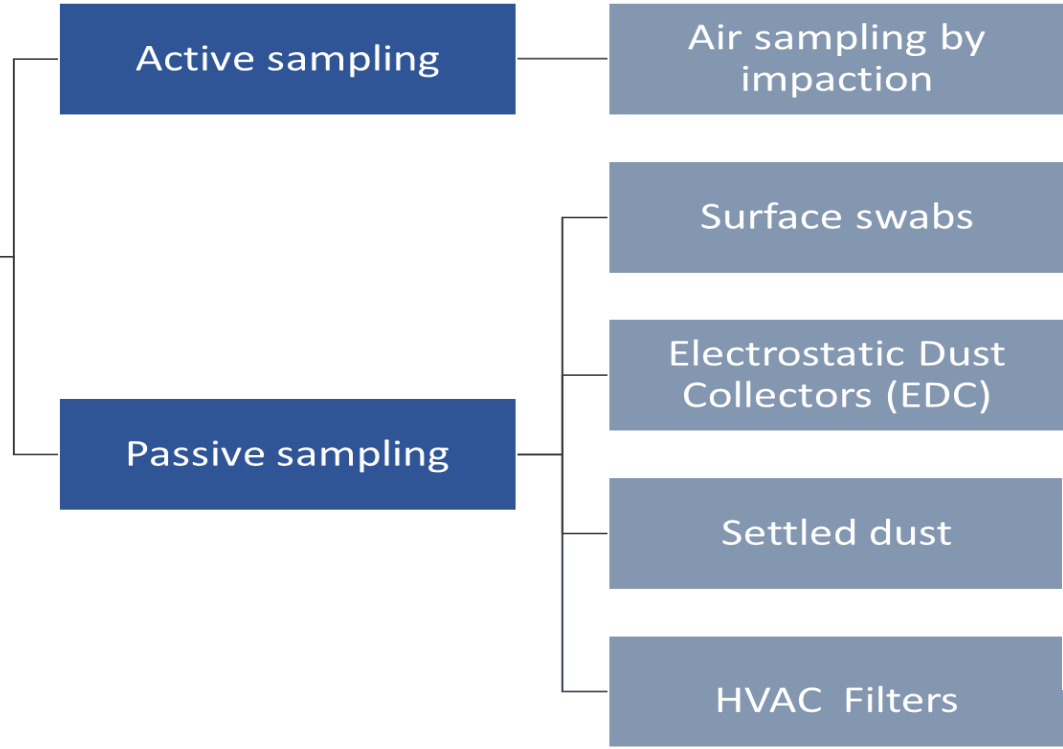
**EXPOSE: Sampling protocol to assess occupational exposure to bioburden in clinical facilities.**



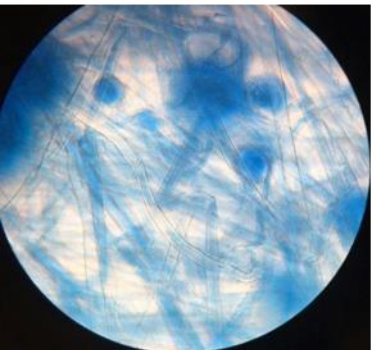
## 2. Materials and methods

10 PHCC in the Lisbon area

Waiting room, treatments room, vaccination room, back and front office, medical office, cleaning supplies room, oral hygiene office, sterilization, and canteen





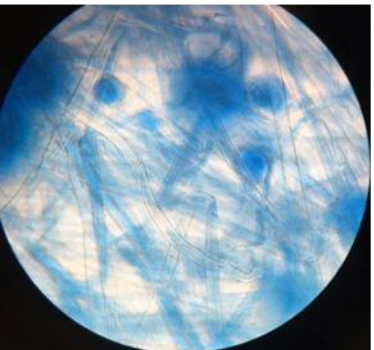


PHCC	Active methods			Passive methods		
	Impaction	Impinger	Surface swab	EDC	Settled dust	HVAC filter
1	7	5	7	7	1	1
2	8	4	8	8	1	1
3	8	4	8	8	1	2
4	8	4	8	8	1	1
5	8	4	8	8	1	1
6	8	4	8	8	1	1
7	11	4	11	11	1	2
8	8	4	8	8	1	2
9	7	4	7	7	1	1
10	8	4	8	8	1	0
<b>Total</b>	<b>81</b>	<b>41</b>	<b>81</b>	<b>81</b>	<b>10</b>	<b>12</b>

### Other performed assessments in the same matrices:

- Fungal biomass
- Toxigenic fungal strains detection
- MRSA prevalence (all passive methods)
- Azole resistance prevalence among the recovered mycobiota
- Mycotoxins
- Endotoxins

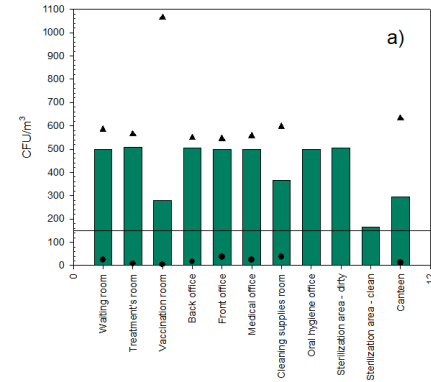




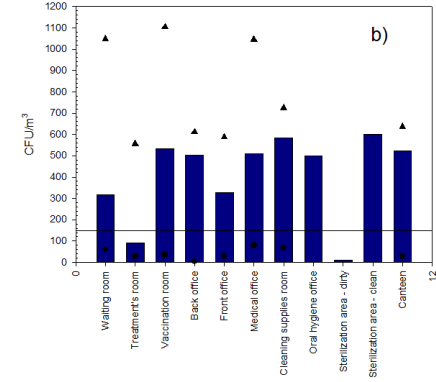
### 3. Results - Fungi

- MEA: only the oral hygiene office is within the limit (150 CFU.m<sup>-3</sup>).
- DG18: only the treatment room and sterilization area (dirty) is complying with the limit.
- **Aspergillus** species among the most prevalent on surfaces and found in passive methods where was not possible to observe with active methods.

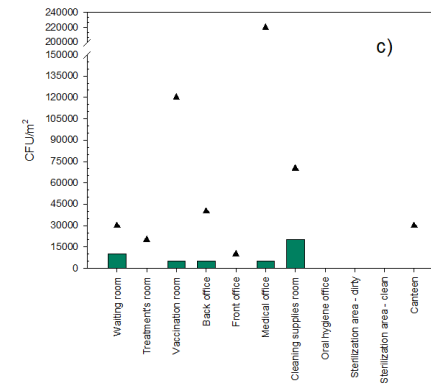
Fungal load on air samples in a) MEA and b) DG18 (The dashed line represents the recommended limit value of ACGIH for fungi (150 CFU.m<sup>-3</sup>), and surface contamination in c) MEA and d) DG18.



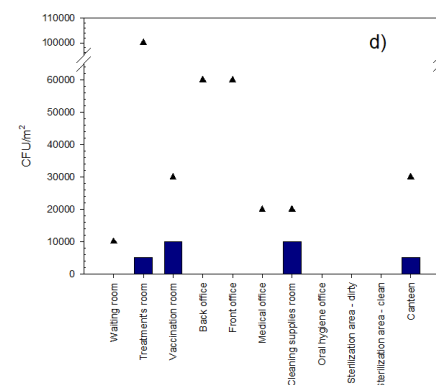
■ Median values of fungal contamination in indoor air (MEA)  
▲ Maximum values of fungal contamination in indoor air (MEA)  
● Minimum values of fungal contamination in indoor air (MEA)  
— ACGIH Committee on bio-aerosols recommended amount of fungi in cleanrooms and hospitals



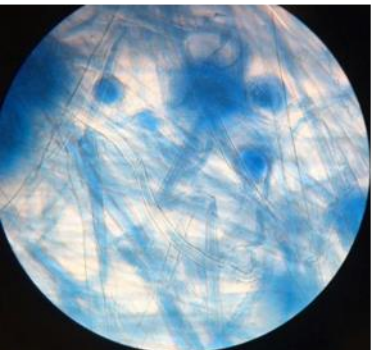
■ Median values of fungal contamination in indoor air (DG18)  
▲ Maximum values of fungal contamination in indoor air (DG18)  
● Minimum values of fungal contamination in indoor air (DG18)  
— ACGIH Committee on bio-aerosols recommended amount of fungi in cleanrooms and hospitals



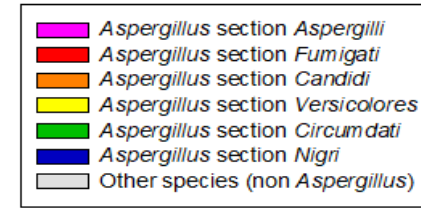
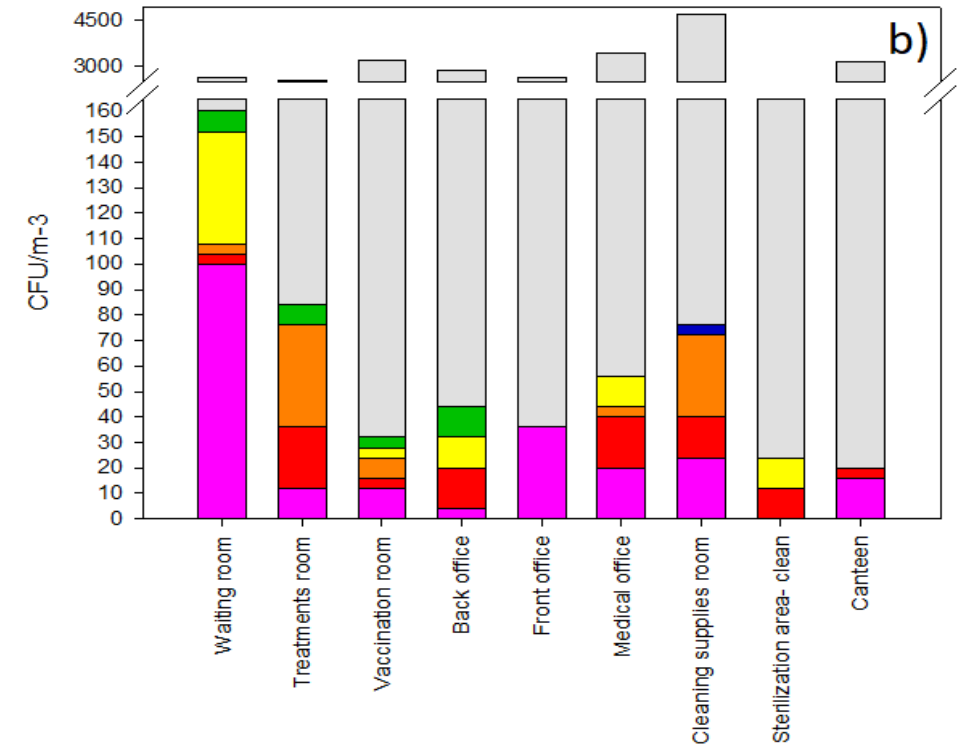
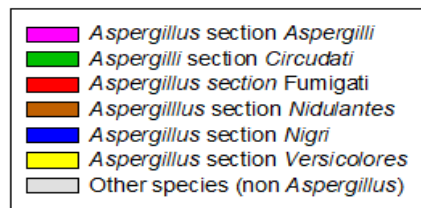
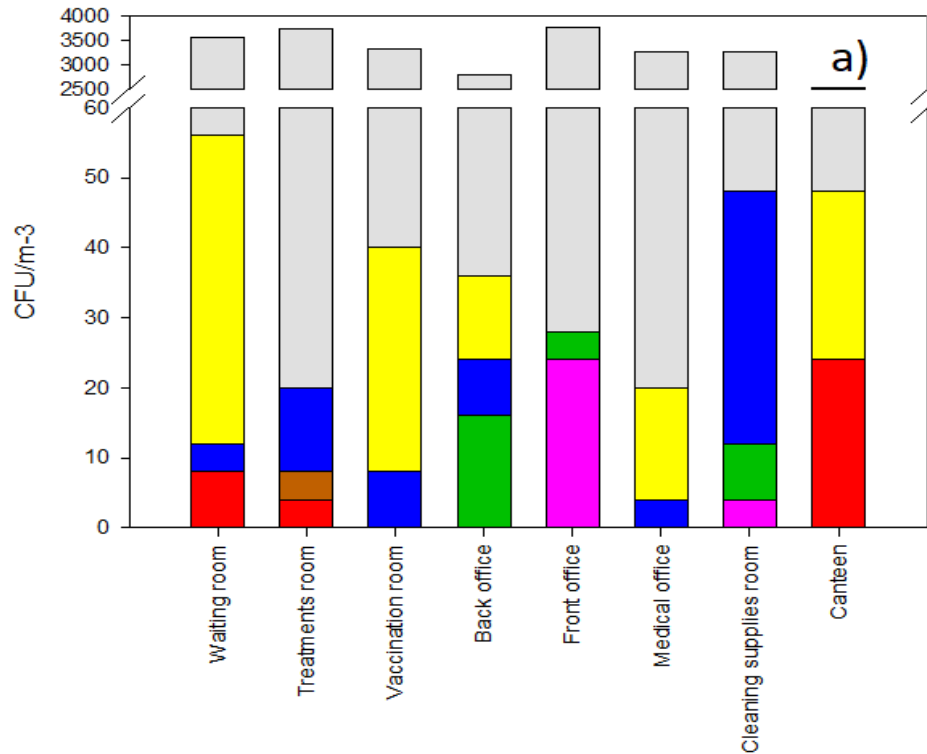
■ Median values of fungal contamination in surfaces (MEA)  
▲ Maximum values of fungal contamination in surfaces (MEA)

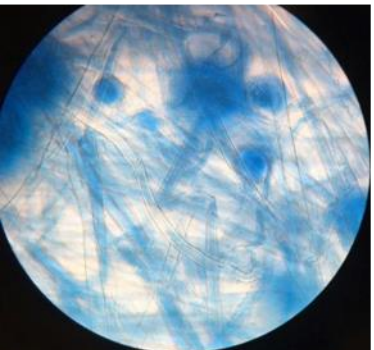


■ Median values of fungal contamination in surfaces (DG18)  
▲ Maximum values of fungal contamination in surfaces (DG18)

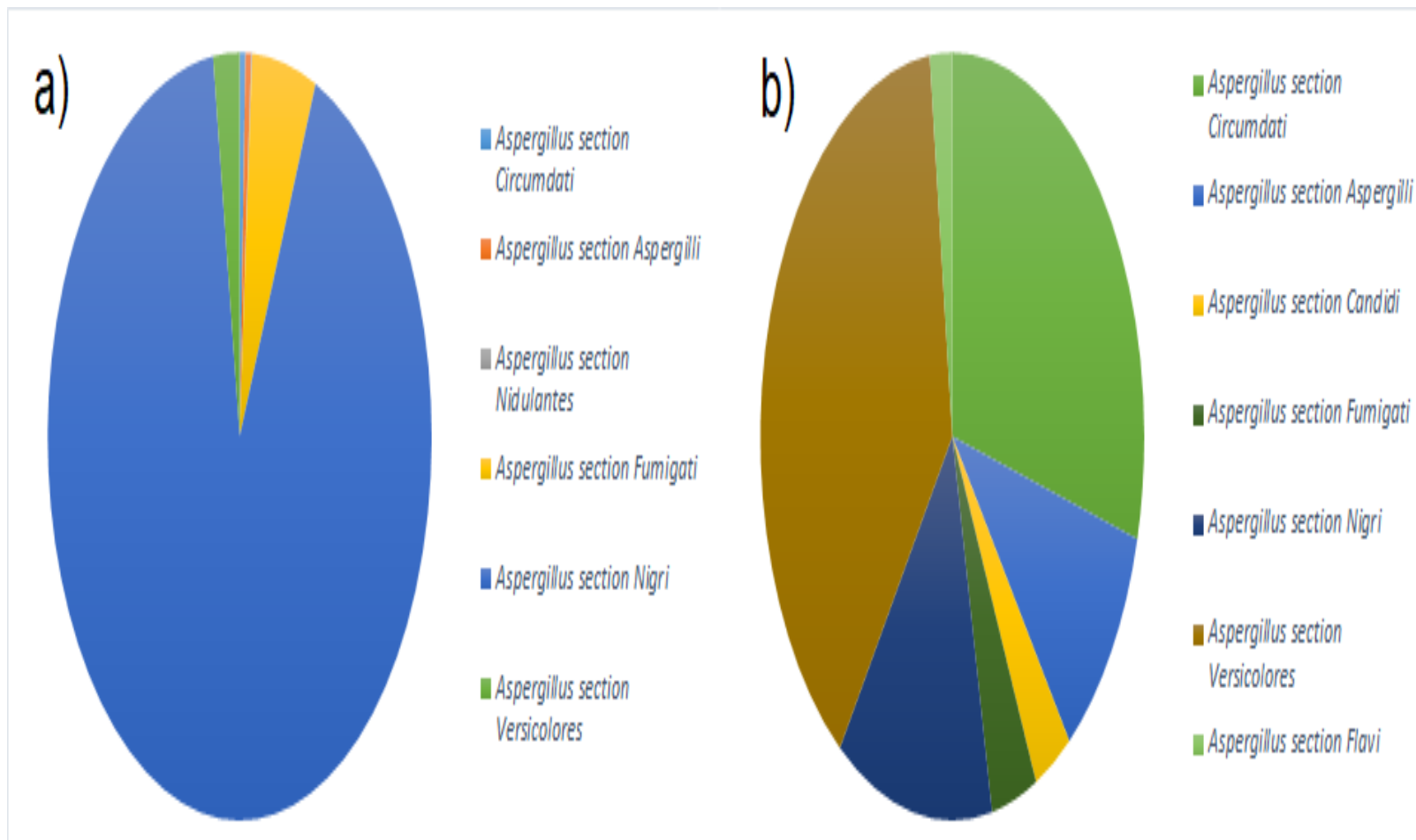


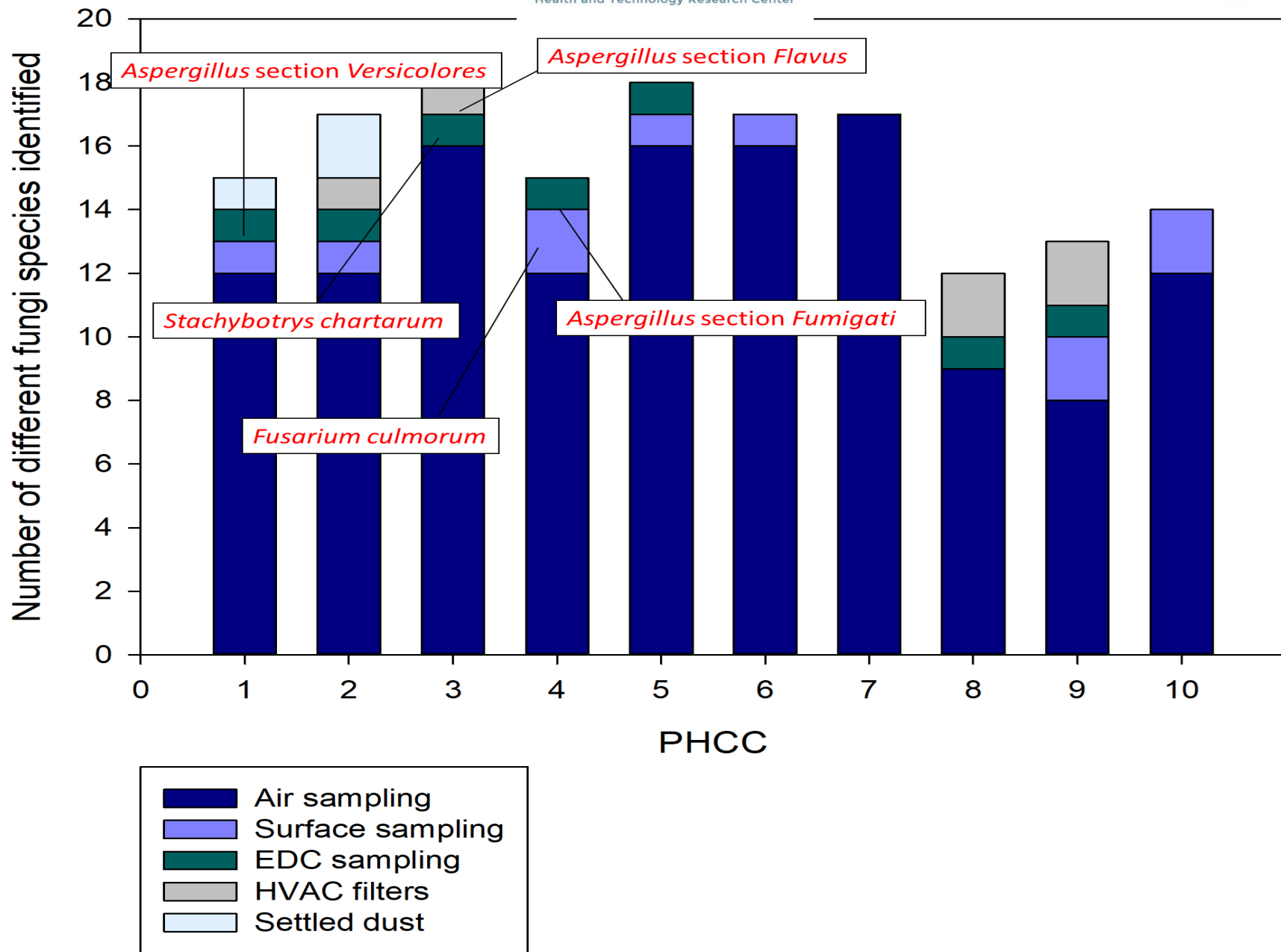
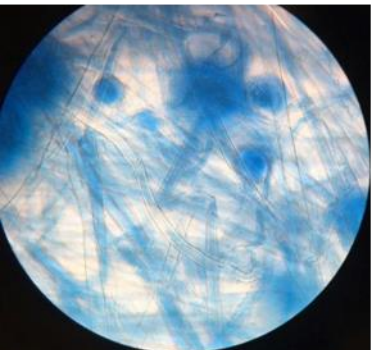
*Aspergillus* sections distribution on air samples collected by impaction method  
a) MEA and b) DG18.

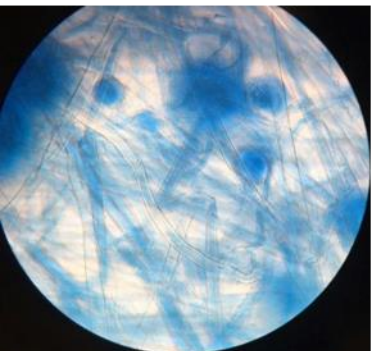




*Aspergillus* sections found in air, surface and HVAC filter samples  
a) MEA and b) DG18.





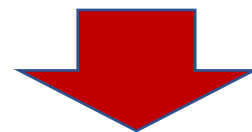


## 4. Main findings discussion

- Passive-collection methods enable the collection of contamination from a larger period of time (days, weeks or several months), whereas air samples can only reflect the load from a shorter period of time (mostly minutes).

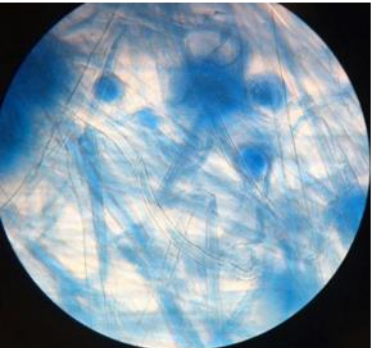
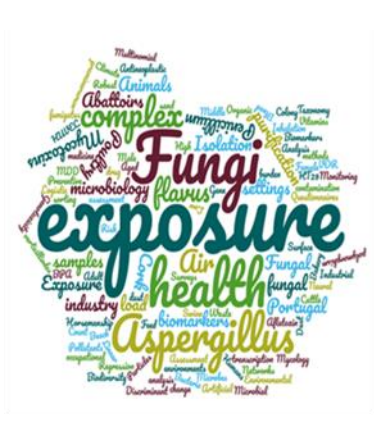
(Viegas et al. 2018)

- A multi-approach on sampling methods should be implemented to obtain not only the fungal load, but also the contamination.



**This sampling protocol will allow an enriched occupational exposure assessment considering both approaches OE and IAQ**





*Once you stop learning, you start dying.*

*Albert Einstein*

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