



## **Innovation in preventive diagnostics to efficiently manage indoor air quality**

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# IAGE in brief

## Experts in molecular biology

### Analysis methods in environmental health

- Examine the interconnected dynamics of global health, spanning from water systems to human health outcomes
- Development of innovative diagnostic methods.

## Our explorers are at your service

### Different aspects to explore within the environment

- Water management
- Plant health
- Animal health
- Human health

## Customer relations

### Environmental analysis institute of montpellier

- A collaborative framework for engagement
- A specialized entity delivering tailored solutions
- Provide comprehensive support throughout the duration of the project



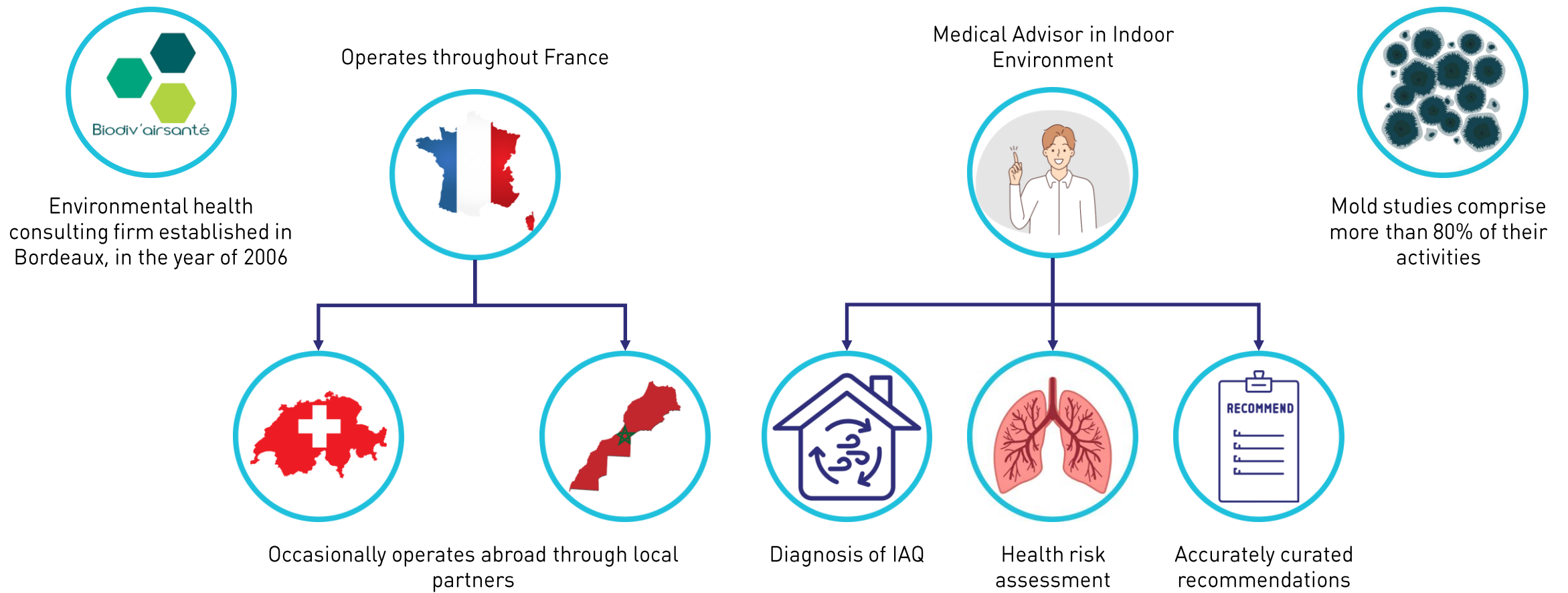
## Quality and requirement system

### Quality driven approaches serving environmental objective

- ISO 9001:2015, Quality management systems
- ISO 17025:2017, General requirements for the competence of testing and calibration laboratories

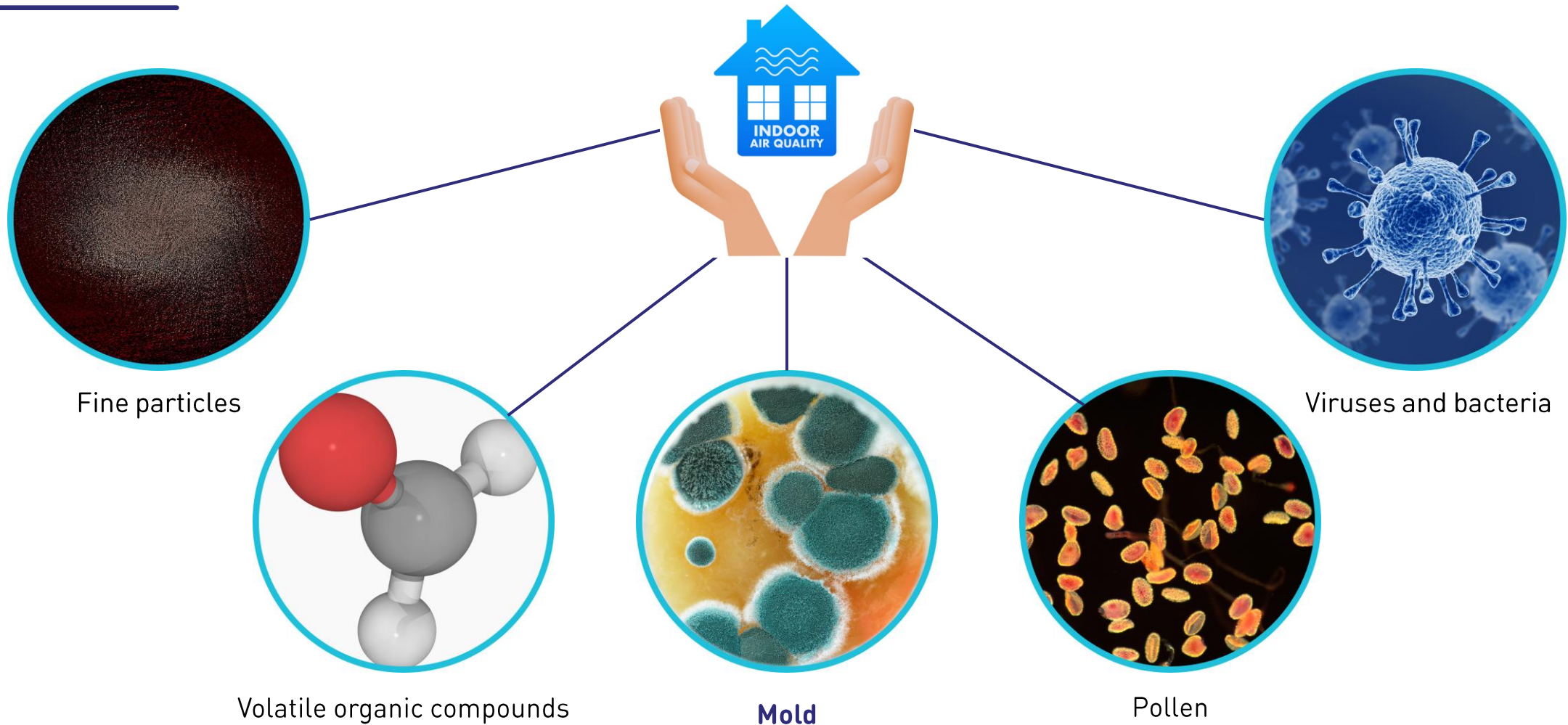


# Our partner Biodiv'AirSanté





# Indoor air quality: Composition





# Indoor air quality : Focus on mold

## Indoor air quality : A major public health issue

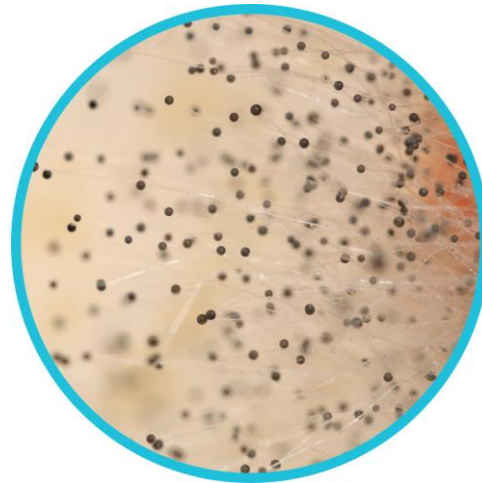
We spend most of our time in small spaces, making indoor air quality crucial for our health. Mold is a common contaminant that is particularly worrying because it is often invisible and grows in the air and areas that are hard to reach

### Favourable environments



Thrives in humid and poorly ventilated environments

### Non-visible contamination



Release toxic spores and volatile organic compounds (VOCs)

### Proliferation



Able to spread not just on visible surfaces, but also **invisibly** in the air and ventilation systems

### Health effects



Respiratory tract irritation as well as increased risk of allergic diseases and infections, especially for individuals who are immunocompromised



## Insight into public health data



21.8 million people suffer from asthma, of which **4.6 million cases** may be a result of dampness and mold exposure **(2007)**



**30,000 asthma cases** Can be mitigated in children between the ages of 6 and 11 by minimizing formaldehyde exposure in schools **(2024)**



Infants who are exposed to mold in their living environment are **3 times more** likely to develop asthma. **(2018)**



At least **45 million buildings** have hazardous mold levels **(2017)**



**12,000 cases of wheezing** can be avoided by eradicating visible mold in classrooms **(2024)**



**Around 40% of asthma attacks** are triggered by the presence of mold, dust mites or rats at home. **(2016)**

Source : <https://www.santepubliquefrance.fr/presse/2024/impact-de-la-pollution-de-l-air-dans-les-etablissements-scolaires-sur-l-asthme-des-enfants-de-6-a-11-ans-sante-publique-france-presente-les-premi>  
<https://realtimelab.com/mold-statistics/>



## General mold data



Effective mold remediation improves air quality, reducing **respiratory irritation in confined spaces by 30 to 40%**



Maintaining humidity **below 60%** prevents mold growth and proliferation



The use of detergents and hot water eliminates **around 90-95% of visible mold spores** on non-porous surfaces.



Porous surfaces can contain up to **100 times more spores** than non-porous surfaces. 60-70% of severe contamination requires removal of porous surfaces.



Complete disinfection of a room, after chemical cleaning and removal of contaminated materials, can **take 3 to 7 days**, depending on the level of contamination.

Source : <https://ehs.ncsu.edu/occupational-health/indoor-air-quality/mold-remediation-guidelines/>  
<https://aircareonline.com/mold-mitigation-for-allergies-and-asthma-how-to-improve-indoor-air-quality/>



# Indoor air quality and microbiological risk

## Mold at risk

Some mold strains pose a major risk to human health because of their allergenic, infectious and toxic effects on the respiratory tract..

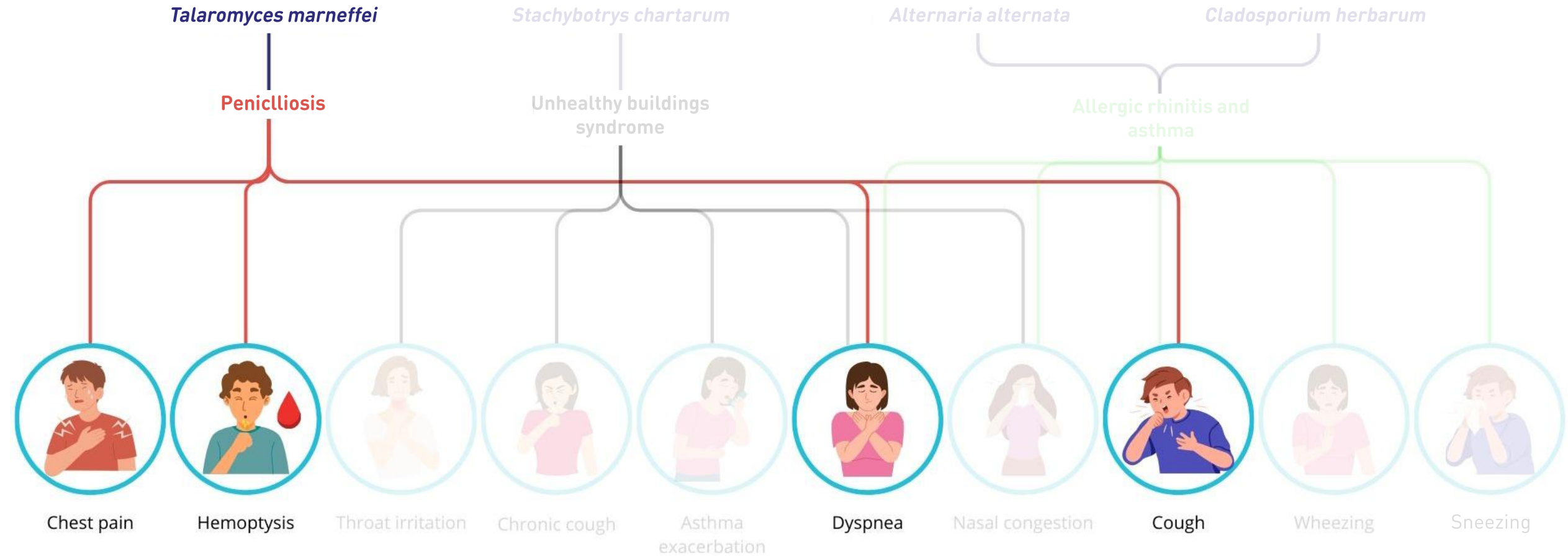


	Sol	Air	Tropical soil rich and humid	Decaying matter	Decaying plant	Decaying wood	Humid paper	Humid wood	Humid carton
<i>Aspergillus.spp</i>	X	X		X					
<i>Cladosporium herbarum</i>		X			X	X			
<i>Talaromyces marneffeii</i>			X	X					
<i>Alternaria alternata</i>	X			X	X				
<i>Stachybotrys chartarum</i>							X	X	X



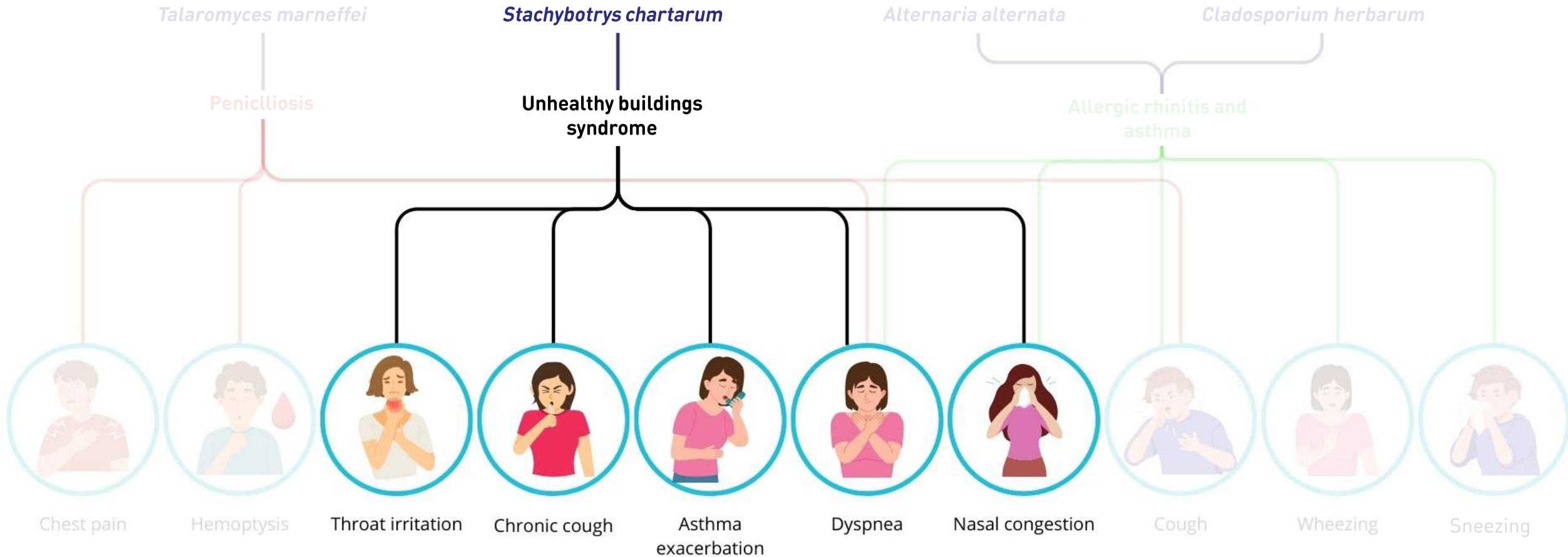


# Associated respiratory diseases and symptoms





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# Associated respiratory diseases and symptoms

*Talaromyces marneffeii*

*Stachybotrys chartarum*

*Alternaria alternata*

*Cladosporium herbarum*

Penicilliosis

Unhealthy buildings syndrome

Allergic rhinitis and asthma



Chest pain

Hemoptysis

Throat irritation

Chronic cough

Asthma exacerbation

Dyspnea

Nasal congestion

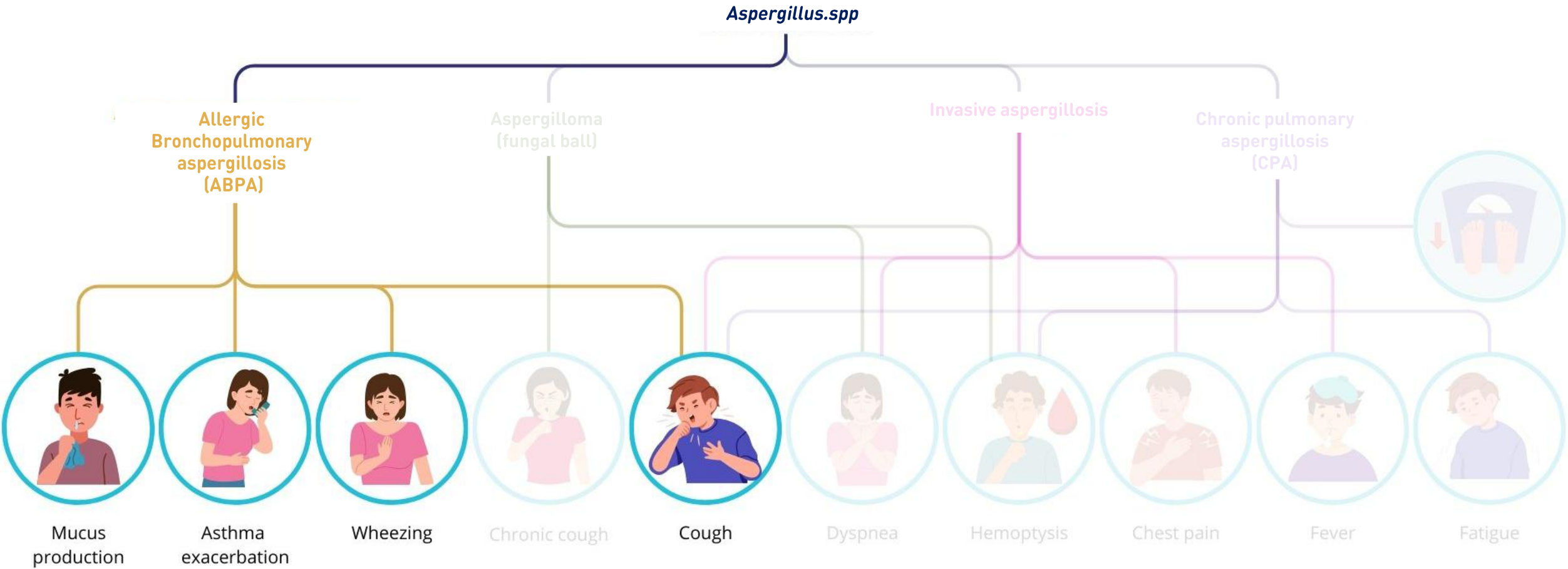
Cough

Wheezing

Sneezing

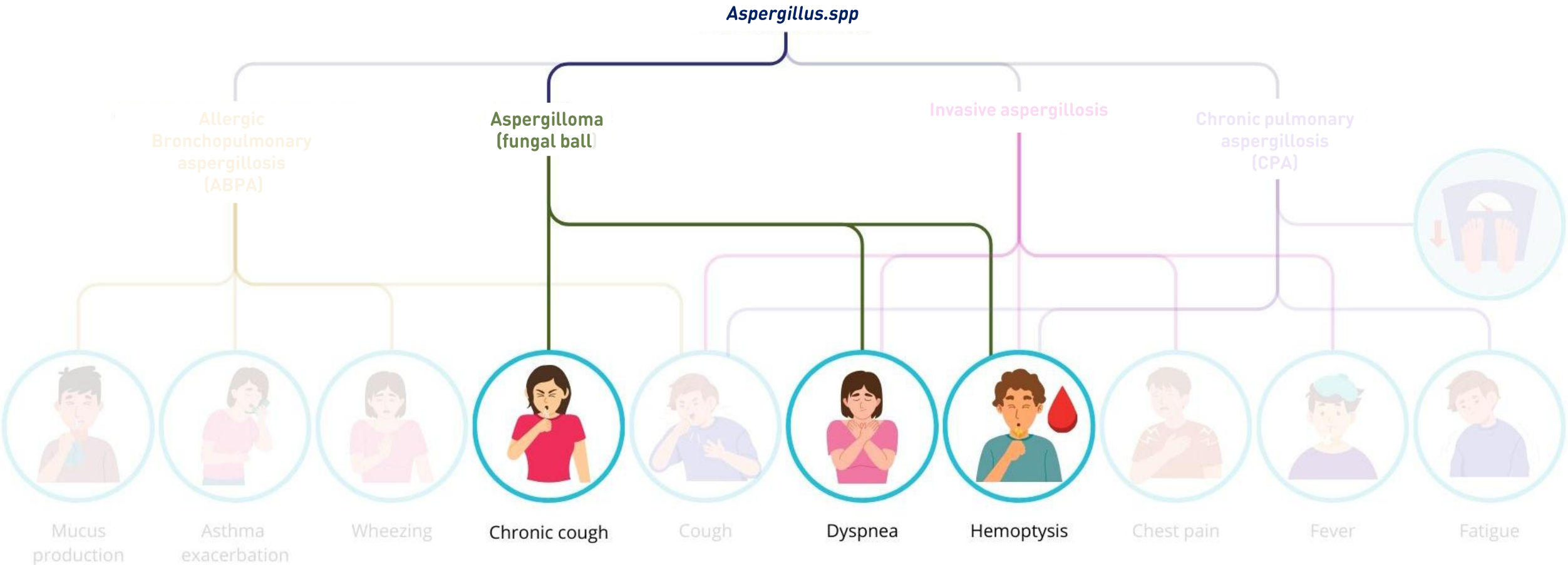


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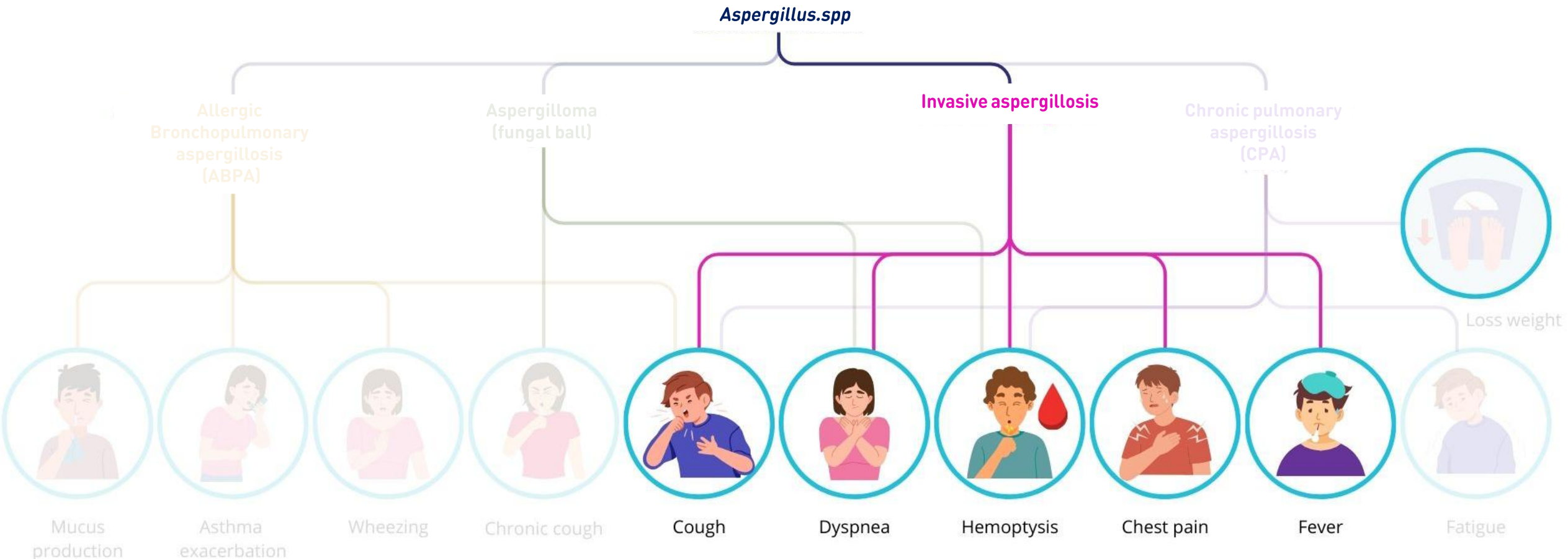


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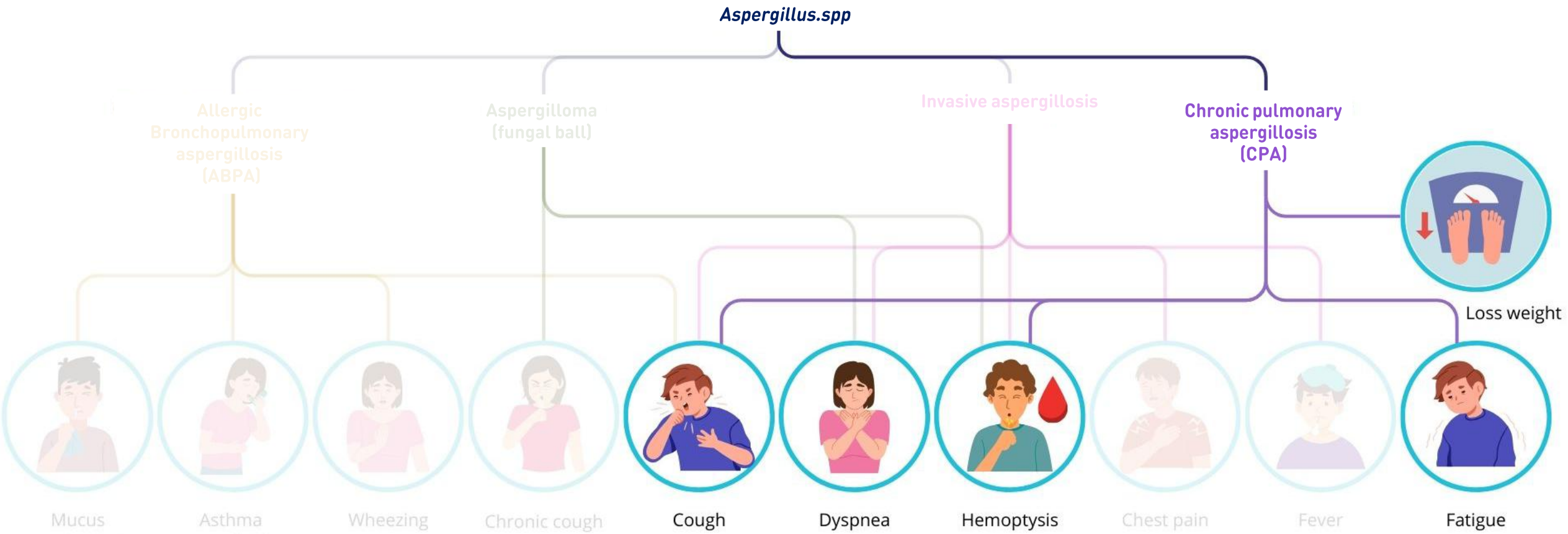


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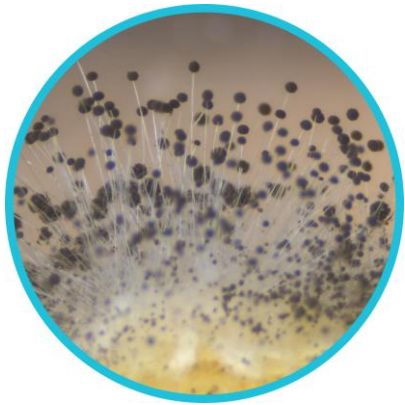




# The IAGE solution

## Analysis advantages

To effectively assess indoor air quality and prevent mold-related health risks, detection and quantification are key steps. These analyses provide an accurate picture of contamination, enabling targeted, proactive management.



Identify and quantify the molds present



Control risks and limit their spread



Target risk areas



Validate decontamination of pathogens



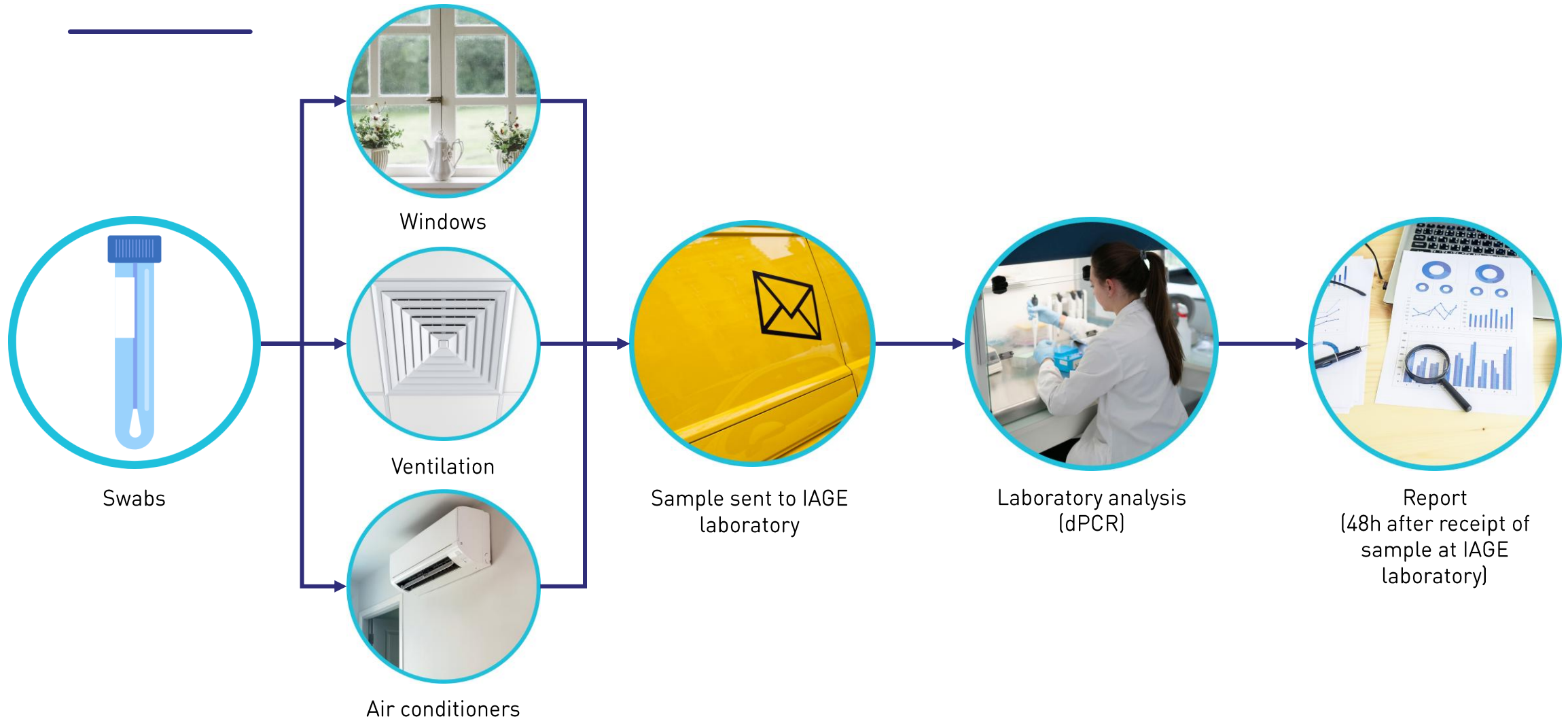
Focus on prevention rather than cure

**Mold detection and quantification analyses allows accurate monitoring of contamination and adaptation of prevention and decontamination strategies to ensure a healthier environment.**





# IAGE method





# Method Comparison

## Speed, efficiency, specificity

For indoor air quality assessment, IAGE combines sampling solutions and dPCR for detection of fungal spore hazards.



	Standard Method	IAGE method
<b>Sample time</b>	<b>[Aerobiocollector]</b> 10 minutes of sampling for 1m3 of air	<b>[Swab]</b> 10 minutes
<b>Analysis time</b>	<b>[Petri dish]</b> 1 week minimum	<b>[DNA extraction +dPCR]</b> 3 hours
<b>Characterization</b>	<b>[Microscopy]</b> A few hours	<b>[DNA extraction +dPCR]</b> Included with the analysis
<b>Specificity</b>	Visual identification and culture media-dependent	Probe and primers allow high specificity
<b>Result delivery</b>	Depending on the mold, between 7 and 14 days	24-48 hours after the reception of the sample by the laboratory

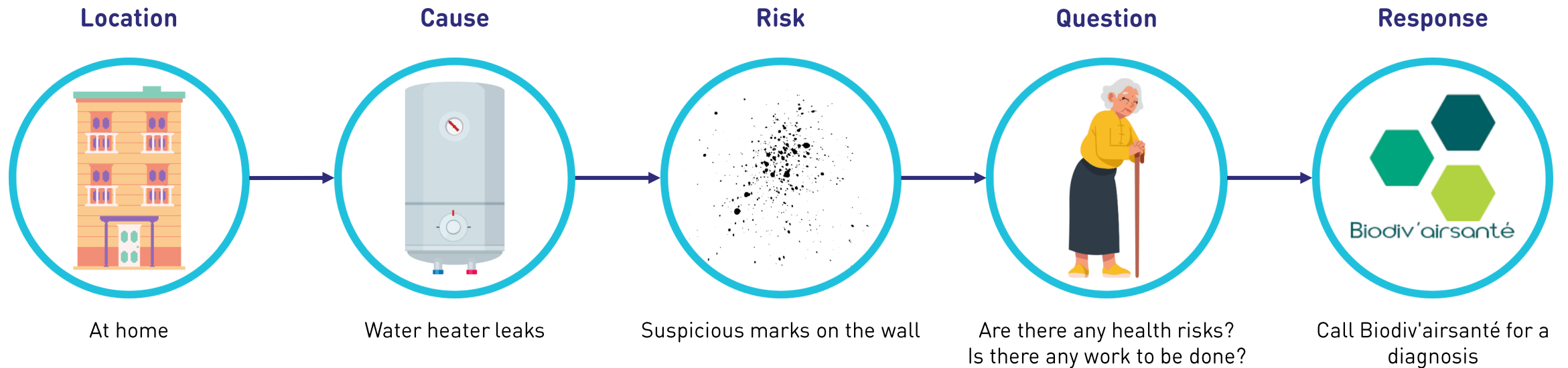


# Case #1: Housing [1/2]

## Prioritizing air quality in housing at risk

The homes of people with respiratory problems, or those at risk of developing them, may be exposed to health risks within their home, particularly due to the presence of *Aspergillus*.

During the first week of November 2024, Biodiv'airSanté was called in to assess these risks.



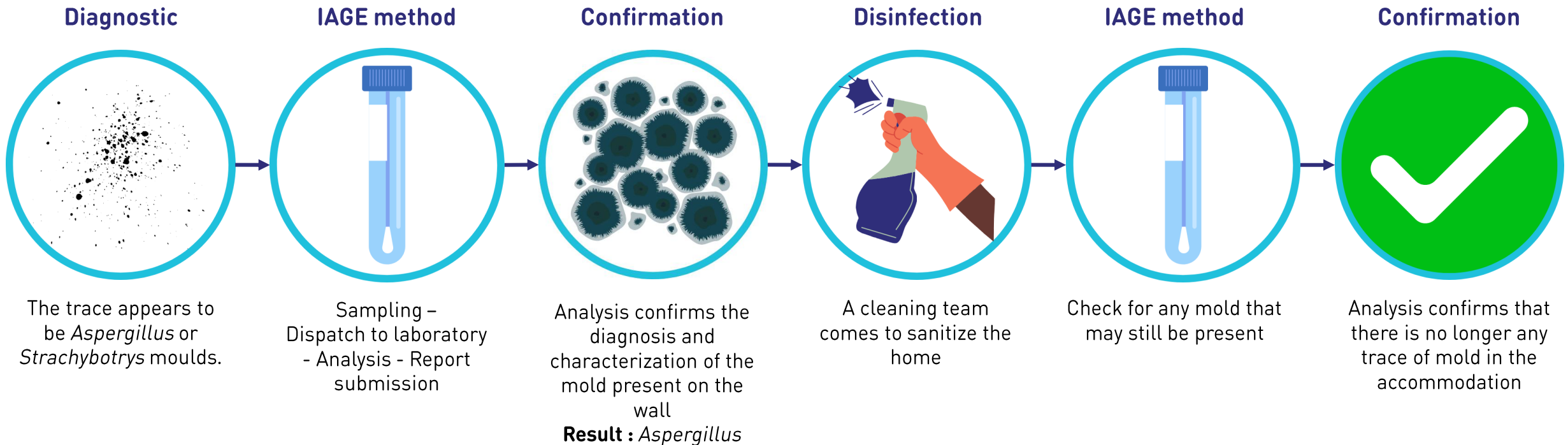


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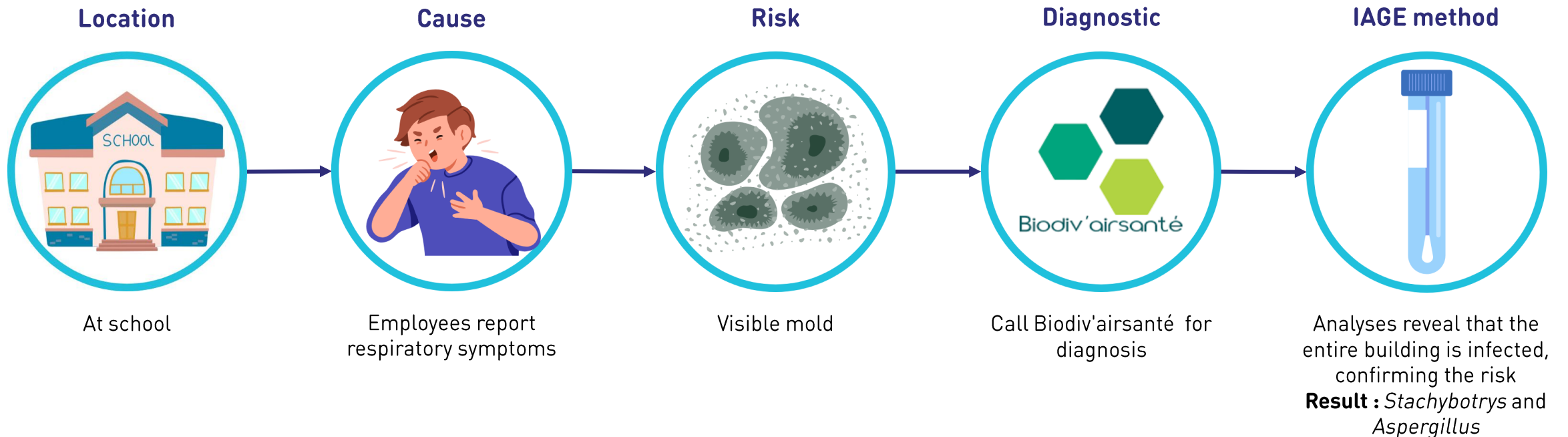


## Case #2 : School [1/3]

### School intervention: for safe and healthy air

Schools, especially those with children who have or are at risk of respiratory problems, may be exposed to health risks, particularly due to the presence of *Aspergillus* or *Stachybotrys*.

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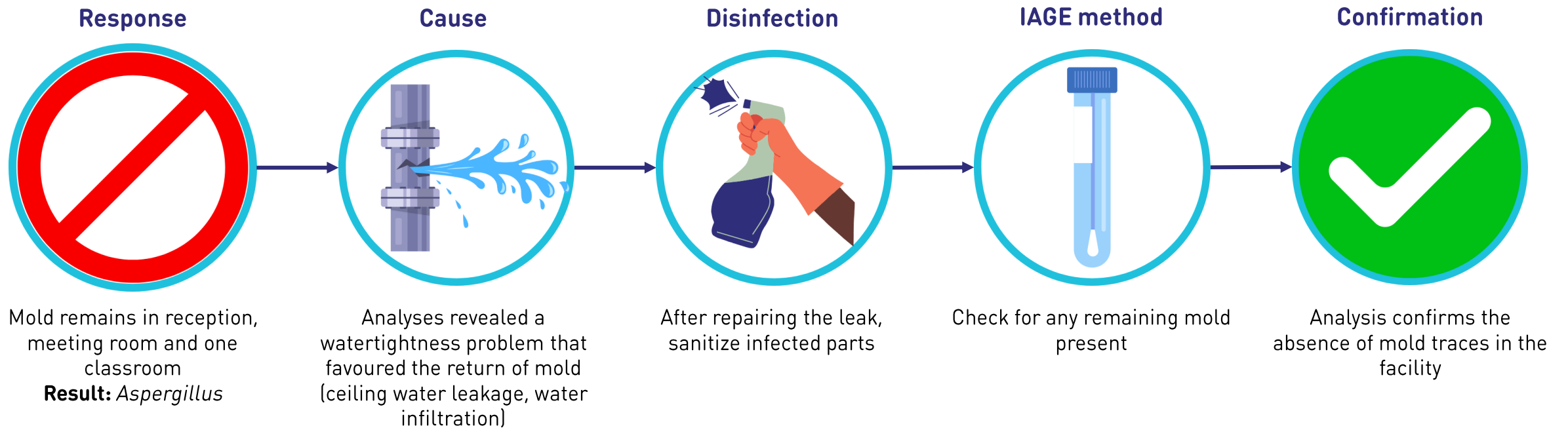


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# Conclusion

## IAGE expertise for health and wellness

IAGE, in collaboration with Biodiv'airSanté, provides rapid and precise solutions to assess indoor air quality. Using advanced technologies like dPCR, we identify contamination sources and implement preventive actions to ensure a healthy environment and protect occupants' health.

### Health risk prevention



Addressing the issue before it escalates

### Improving living conditions



Safeguard the well-being of occupants and preserve the integrity of the building

### Reliability and speed



Deliver fast and accurate results, enabling the early detection of allergic mold

### Biodiv'airsanté



Biodiv'airsanté's expertise helps prevent health risks linked to indoor air quality

### IAGE



Reliable, innovative solutions to detect and prevent mold-related risks, ensuring a safe, healthy environment





**Thank you for your attention**

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