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FIRST INSIGHTS OF PORTUGUESE PRIMARY SCHOOLS' FUNGAL ASSESSMENT – IS INDOOR AIR QUALITY COMPLYING WITH PORTUGUESE LEGAL FRAMEWORK?

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WHY TO ASSESS MICROBIAL CONTAMINATION IN SCHOOLS?

322.736 Children in Portuguese Elementary Schools[1]

Spend na average of **6 h/day** for **179 days/year**

Teaching staff, school workers spent at least **8h in schools**

"The **school**, by constituting itself as a **safe and healthy space**, facilitates the adoption of **healthier behaviors**, being in an ideal position to **promote and maintain the health of the educational community** and the surrounding community."[2]

EXPOSURE TO BIOAEROSOLS

- Indoor Air Quality (IAQ) is an important determinant of human health, especially for children[3]

- Children are exposed to fungal with pathogenic and toxigenic potential in Schools

- Bioaerosols assessment necessary to:
  - Create healthier school environments
  - Improve learning conditions
  - Improve children's health outcomes

PREVENTION AND CONTROL MEASURES

- International Guidelines

- WHO fungal priority pathogens list[4]: guidance for research and public health actions
- Compendium of WHO and other UN guidance on health and environment - Air Pollution[5]: Dampness and mould exposure assessment guidance
- United States Environmental Protection Agency[6]: Policy brief focusing on hygiene and overall structural condition to prevent mould development;

- Portugal Guidelines

- Ordinance n.º 353-A/2013[7]: Thresholds of protection and reference conditions for indoor air pollutants in commercial and service buildings, along with their respective assessment methodology.
- National School Health Program[8]: Promote and protect health and prevent disease within the educational community; Promote a safe and healthy school environment.

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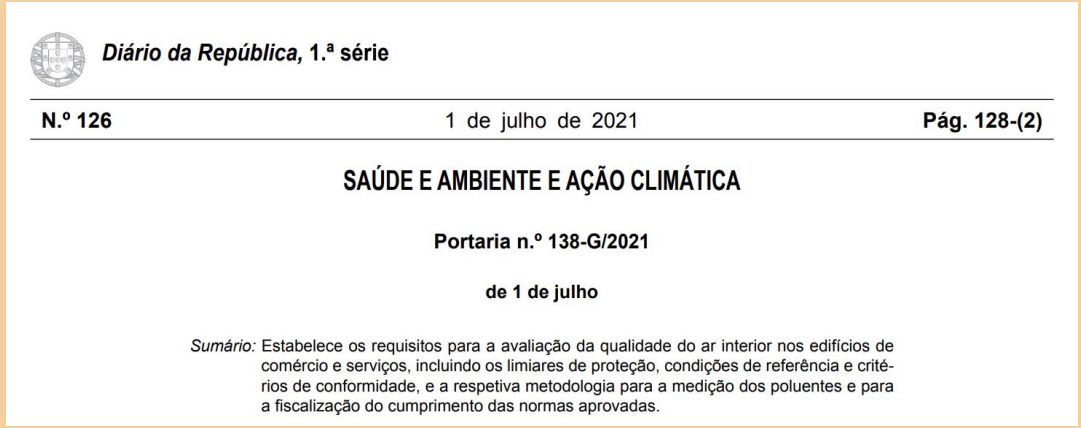
Bioburden in health care centers: Is the compliance with Portuguese legislation enough to prevent and control infection?

Carla Viegas[a,b,*], Beatriz Almeida[a], Ana Monteiro[a,c], Liliana Aranha Caetano[a,d], Elisabete Carolino[a], Anita Quintal Gomes[a,e], Magdalena Twarużek[f], Robert Kosicki[f], Geneviéve Marchand[g], Susana Viegas[a,b]



Diário da República, 1.ª série

N.º 126 — 1 de julho de 2021 — Pág. 128-(2)

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.

Protection thresholds and reference conditions for indoor air pollution, in commercial and service buildings and assessment methodology, **leaving schools neglected for such parameters**[2].

Impact the school occupants 'health and well-being[9]

Impact learning conditions[9]

More efficiency, more sustainability (at all levels)[9]

Good IAQ, healthy buildings, healthy environment[9]

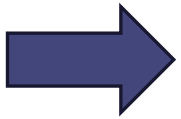
AIM

This study aims to assess fungal load compliance at various sites within schools located in the Lisbon area and to compare the results in light of Portuguese air quality legislation.

SAMPLING

- Public Elementary schools (children aged between 6 and 10 years old);
- Schools within rural or urban environments;
- Warm season (Jun – September 2023)

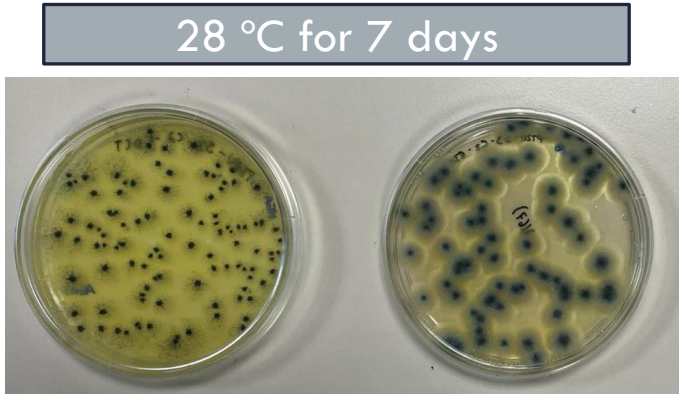
Setting	School
Rural	3
Urban	7
Total	10



Bathroom	Classroom	Canteen	Gymnasium	Library
7	10	9	6	8

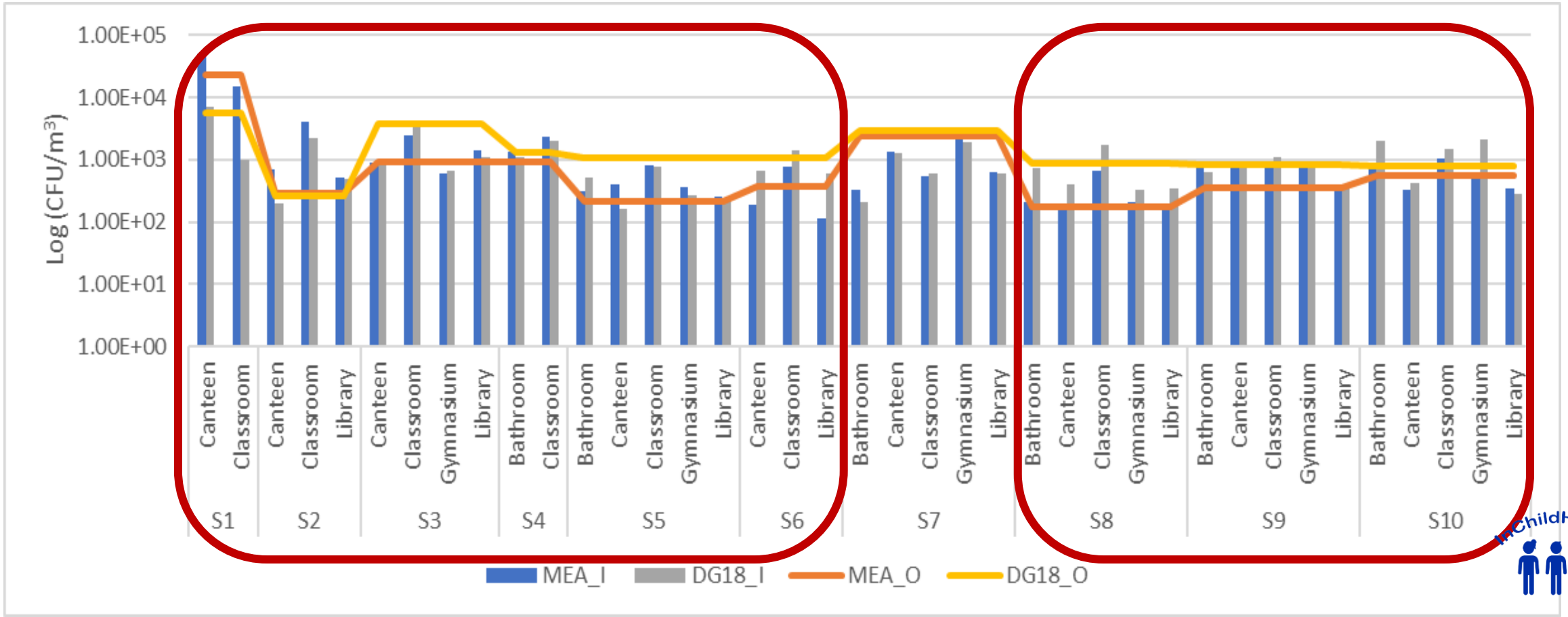
SAMPLING

- Active sampling
  - 1 MAS-100 air sampler
  - 2 min sampling/culture media
  - MEA and DG18 (inc. T. 28°C for 7 days).



RESULTS AND DISCUSSION

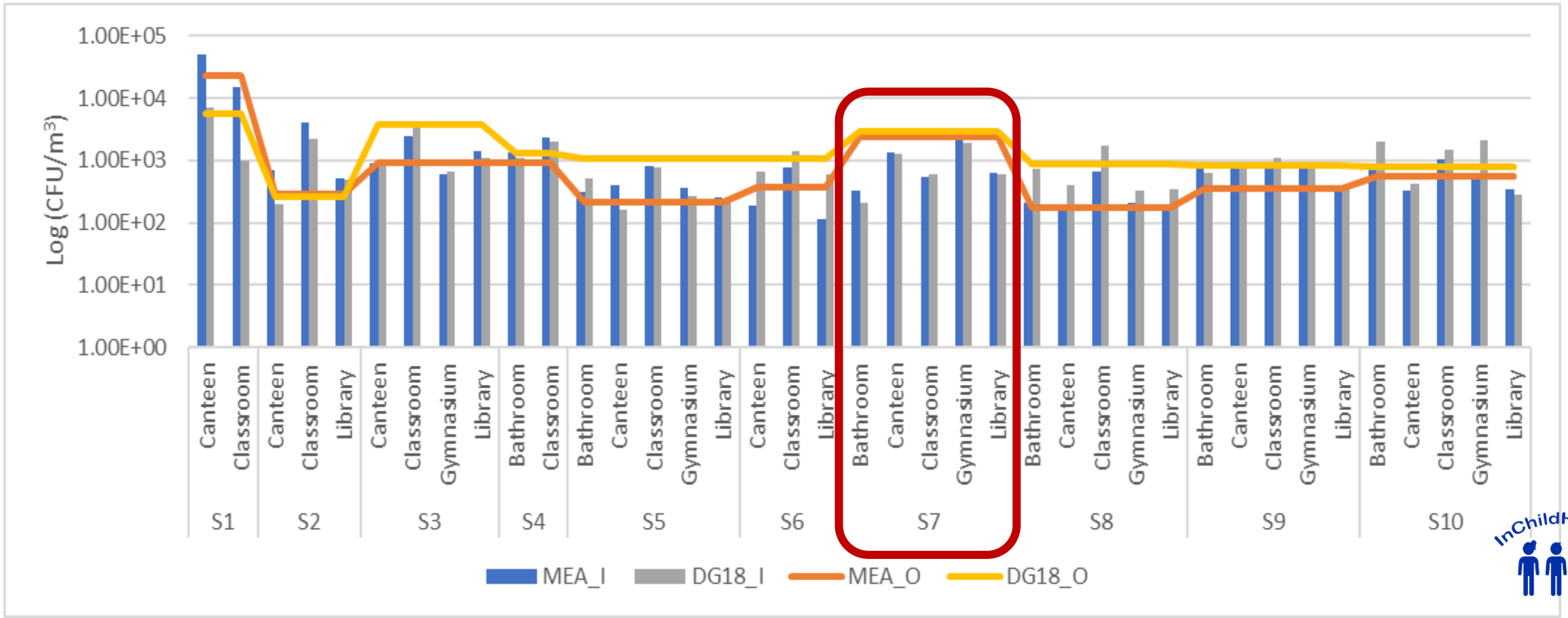
- MAS-100 contamination results



RESULTS AND DISCUSSION

- 9 / 10 did not comply with the Portuguese legal framework in at least one site
  - 8 /10 in the classrooms
  - 5 / 7 in the bathroom
  - 4 / 9 in the canteen
  - 4 / 6 in the gymnasiums
  - 3 / 8 in the library

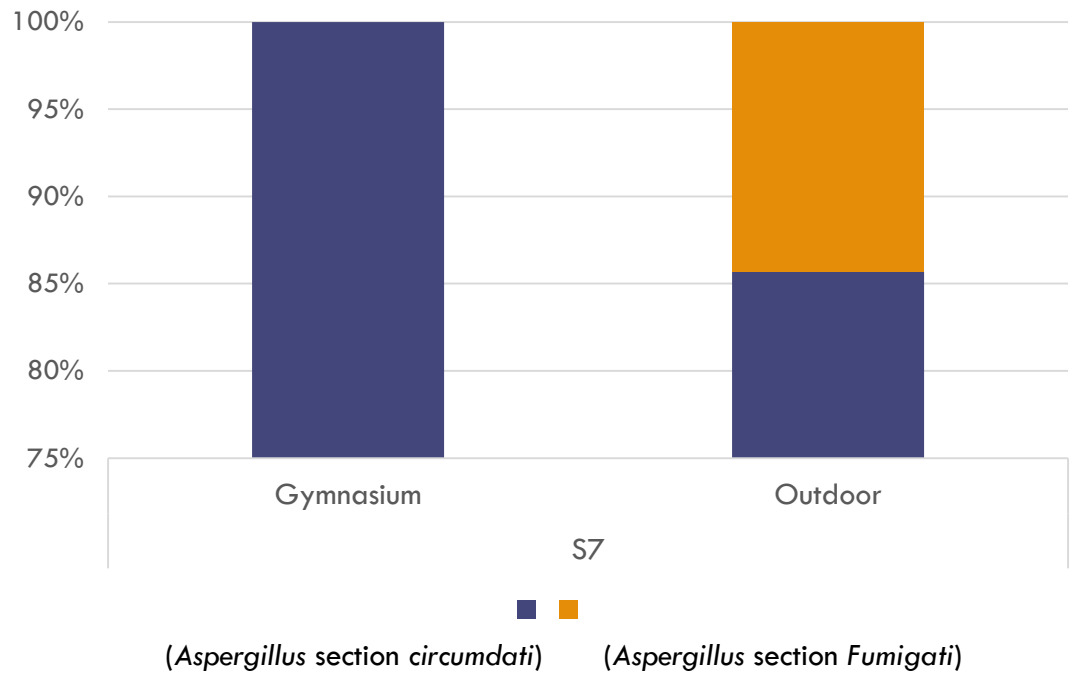
RESULTS AND DISCUSSION



RESULTS AND DISCUSSION

- 1 / 10 (S7) complies with the Portuguese legal framework! **But…**
    - High outdoor load
    - Nearby an airport
    - Vegetation surrounding the school
    - Located in a high populated urban social neighbourhood
    - Small classrooms with a high number of children
    - Visibly dirty indoors

Critical species identified



Does not meet the toxigenic species quantitative cut-off

CONCLUSIONS

- Not complying with the Portuguese IAQ legal framework (quantitatively and qualitatively)
- *Aspergillus* sections are widespread (clinical relevance and toxicological potential)
- Cleaning procedures revision and guidance on this matter
- Microbial air quality surveillance in need!

- Legal framework discussion/Specific for schools?
- Staff education regarding the best cleaning practices?

NEXT STEPS?

Contextual and operational information collection

- Contamination sources identification
- Cleaning procedures applied

Corroborating data from:

- Personal air samplers
- 6-stage air sampler
- Passive samples (EDC, EDCT, Settled dust, Dust filers, Mops)

Risk assessment

Fill the gaps in IAQ policies, supporting regulators and exposure assessors on primary schools' IAQ improvement.

InChildHealth

IMPROVE CHILDREN'S LEARNING CONDITIONS AND HEALTH OUTCOMES

The risk of exposure to pathogenic fungi poses a **major public health threat** for school-age children impacting not only **treatable fungal infections** but also **students' learning conditions** and **outcomes**[3]

OUR TEAM

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InChildHealth

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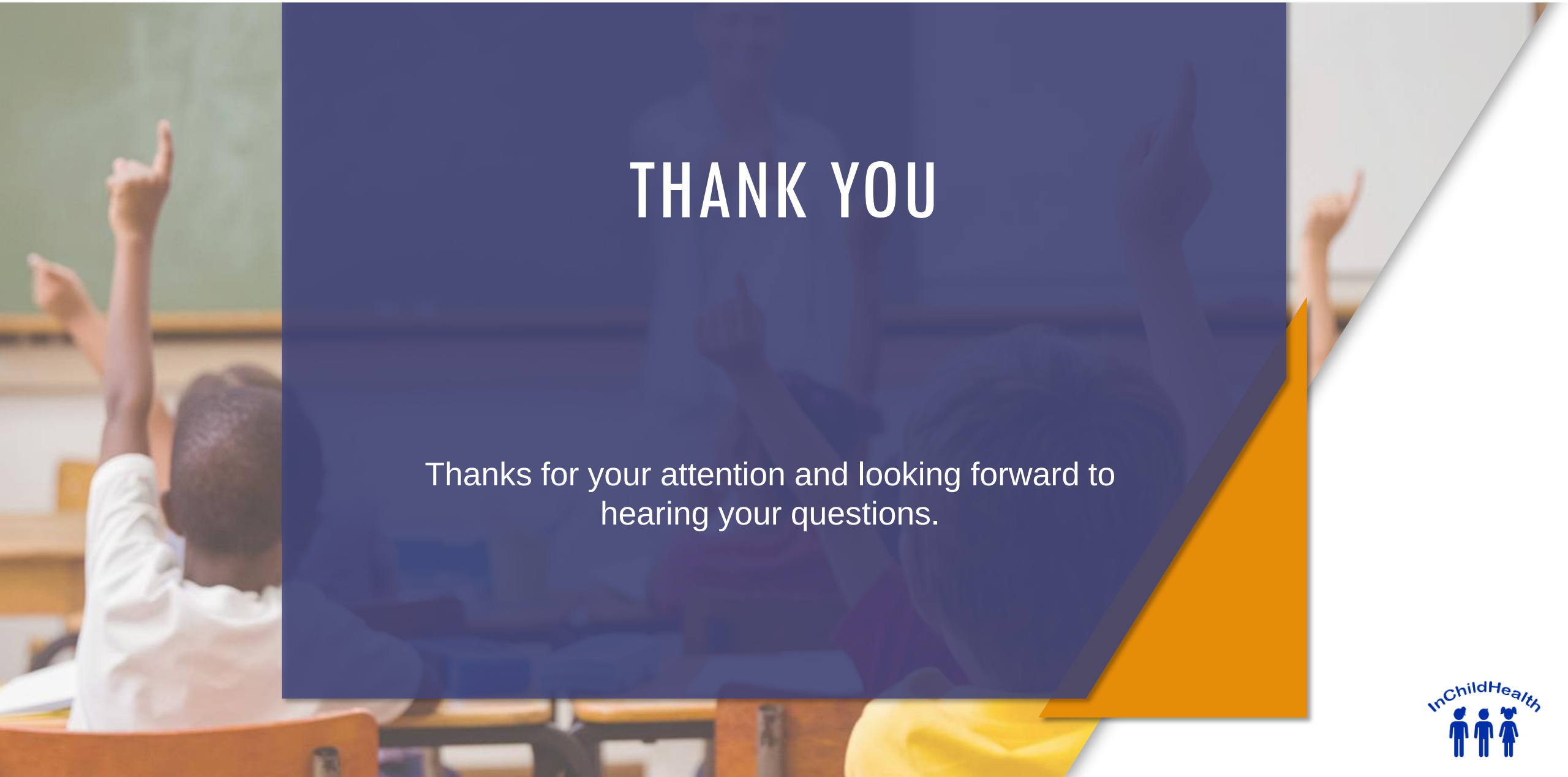

THANK YOU

Thanks for your attention and looking forward to hearing your questions.