

The InChildHealth Walkthrough Survey – towards a standardized characterization of classrooms for Indoor Air Quality studies in Europe

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SUMMARY

The Horizon Europe project InChildHealth aims to study indoor air quality in European schools and the effects of physical, chemical and microbiological parameters on the health of school children aged 6-13. As schools in Europe can vary considerably in terms of size, age, materials, equipment, heating, ventilation and air conditioning (HVAC), cleaning procedures etc., a questionnaire was developed for a standardized description of classrooms and schools. It includes 86 mandatory and 82 optional questions, targeting building characteristics and potential sources of exposure to particles, chemicals and microorganisms. The survey has been implemented digitally with the option of paper-based versions and future data sharing for combined data interpretation. The project foresees the possibility of revisions based on lessons learnt from the application in seven European cities. The final version can be adjusted to other microenvironments and used in future indoor air studies in Europe and elsewhere.

KEYWORDS

Chemicals, exposure, indoor environment, microorganisms, particles

1 INTRODUCTION

Children spend a considerable amount of time in the indoor school environment, making it a potential contributor to their exposure to indoor air pollutants (Sadri-zadeh et al., 2022). Schools in Europe vary in terms of age of the building, number of students, building characteristics such as materials, heating, ventilation and air conditioning (HVAC), classroom furniture and equipment. In addition, cultures and habits vary, regarding length of school days, meals, specialized classrooms (science, arts), cleaning practices, use of computers etc. The InChildHealth project addresses the integrated indoor exposure of school children and potential health effects in at least seven European cities. To ensure comparability across locations,

this study aimed to develop a standardized characterization of the schools in the project, while leaving sufficient flexibility for national, regional or discipline-related specifics.

2 METHODS

The standardized questionnaire was developed in an interdisciplinary approach, combining expertise in construction and engineering, microbiology, physics, environmental chemistry and public health. In a first step, experts phrased questions in their discipline, for critical discussion in the multidisciplinary project group regarding i) relevance for the integrated exposure assessment, ii) applicability to all cities and countries represented, iii) unambiguity of the questions, iv) their classification as mandatory or optional. The second step focussed on the practical implementation, including possibilities for data collection on paper and digitally, appropriate timelines, translations into other languages than English, and training of onsite data collectors. Tests at selected schools helped identify potential issues. Compliance with the General Data Protection Regulation of the European Union was considered in all steps.

3 RESULTS AND DISCUSSION

The overall structure of the walkthrough survey is summarized in Table 1. Most questions can be answered with “Yes/No” or a number. The section on HVAC includes questions about distances between potential outdoor pollution sources (e.g. the car park) and air inlets to the school. The part on classroom interior includes several multiple-choice answers for materials (e.g. floors, walls). Illustrations are included to improve clarity. The questionnaire has been implemented in a publicly available research software under institutional licence, which allows paper-based and digital data collection as well as data sharing.

Table 1. Mandatory part of the InChildHealth Walkthrough Survey for schools

Section	Example	Questions
Introduction	Date, name	2
General information	School address, number of students and teachers, educational level	13
School building	Number of rooms, gymnasium, kitchen/meals prepared at school	16
Surroundings	Agriculture, traffic, other potential pollutant sources	6
HVAC system	Air circulation in the air handling units, maintenance plan	13
Classroom interior	Floor material, number of computers	23
Hygiene, air quality and food safety	Number of waste containers, cleaning routines	13

The work revealed major differences among countries and schools, highlighting the need for a standardized approach to their description, to ensure a common platform for the interpretation of ongoing measurements and subsequent exposure assessments. The large number of optional questions allows for discipline-specific research, e.g. related to chemicals or microbial exposure, in addition to the interdisciplinary approach of the InChildHealth project.

4 CONCLUSIONS

The project foresees a phase of revisions based on lessons learnt in the current application phase. Work is ongoing on a survey for homes and on a citizen-science version for children.

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6 REFERENCES

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