

Prevention of asthma and allergies (Banska Bystrica, Slovakia)

Risk factor: Indoor air pollution

Policy objective: CEHAPE Regional Priority Goal III - *ensure clean outdoor and indoor air*

Type of action: Monitoring of environmental exposure, education and communication

Scope	District: Banska Bystrica, Brezno
Setting	Kindergartens, households
Target audience	Teachers/school administrators, parents/family, children 2–6
Target beneficiaries	Children 1–15, parents/family
Driving force(s)	Kindergarten directors, teachers; Public health professionals from Regional Authority of Public Health in Banska Bystrica, Department of Hygiene of Children and Adolescents; National Reference Centre of Indoor Air Quality at Regional Authority of Public Health in Banska Bystrica
Partners	Parents; Kindergarten staff
Start date and duration	2005–2008 (3 years)
Target population reached	1600 teachers, school administrators and parents; 800 children 2–6
Resources	Less than € 5000; Paid staff: 5 for planning, 7 for implementation, 4 for evaluation; Volunteers: 1

Rationale:

Indoor Air Quality and Housing is one of the priority areas of the updated Slovakian National Environment and Health Action Plan. According to findings of environmental studies, the causes of asthma and allergy are unclear, but many hypotheses blame living conditions and lifestyle factors. The incidence of allergies, asthma and respiratory diseases has risen in recent years. The number of atopic individuals in the Slovak Republic is estimated at approximately 40% of the population. The prevalence of atopy and the incidence of allergic diseases in children aged 10–11 in the Slovak Republic were studied in the CESAR Project, which determined the proportions of allergen-specific IgE for a group of household environment allergens: moulds (M_1) – 5.1%; mites *D. pteronyssinus* (D_1) – 27.7%; *D. pharinae* (D_2) – 25.0%.

Objectives:

- to investigate the level of bacteria, fungi and mite concentrations in indoor air and dust
- to identify risk factors in the indoor environment affecting sensitization and morbidity
- to improve health information regarding asthma, allergies and indoor air pollution
- to encourage multidisciplinary cooperation on this issue

Description:

The programme consisted of an assessment of exposure to aeroallergens and an educational campaign on the risk factors for asthma and allergies, with special attention to indoor environments and ways to reduce indoor exposure to risk factors. The focus was to assess the microbial and biological status of the indoor environment of kindergartens in particular and to establish a strategy to deal with this type of problem.

Local public health professionals visited 10 randomly selected kindergartens in urban and rural areas to contact directors and teachers in order to identify the main environmental health issues affecting children in the kindergarten environment (moisture, moulds, fungi, mites). The concentrations of microorganisms and fungi were measured by Standards RCS Air Sampler; and samples of settled dust were collected by vacuum cleaner to identify the amounts of house dust mite allergens, expressed as guanine levels related to the antigenicity of the dust. The limit concentration was considered < 0.6 mg guanine/1 g dust. Sources of indoor air risk factors were evaluated by means of questionnaires. Measures to improve indoor air quality in kindergartens were developed based on these results and a leaflet, *Small Guide for Environmental Health*, was prepared for directors and teachers.

Planning and implementation:

Planning process:

The following actions took place during the planning stage of the programme:

- meetings with directors and teachers of kindergartens about survey requirements and to request their cooperation
- meetings with experts from the National Reference Centre on Indoor Air Quality about methodology for taking samples of air or dust from indoor spaces to detect total counts of microorganisms, moulds, fungi and dust mites
- meetings with professionals from the Regional Authority Department of Education about planned activities and objectives and the request for cooperation to carry out the survey in 10 kindergartens

Results:

The programme's objectives were partially achieved. Experts from the microbiological and biological department of the Regional Authority of Public Health were consulted for the evaluation of the initiative. Experts from the Regional Authority Department of Education and directors and teachers gave advice on remedial measures. Microbiological and biological indoor air risk factors have been evaluated. Preliminary results consisted of identification of most common indoor problems in 10 kindergartens.

The environments of all monitored kindergartens were in the category of very low or middle levels of pollution with regard to concentrations of fungi (< 500 CFUs/m³).

Seventy-five percent of the monitored kindergartens were found to have high levels of microorganism pollution (>500 CFUs/m³).

The concentration level of dust mites was positive (concentration higher than the limit concentration 0.6 mg of guanine/1g dust) in 30% of monitored kindergartens during summer time and 70% of these kindergartens during winter time.

The assessment of indoor air risk factors by means of survey questionnaire gave the following results:

Eight kindergartens were classified as having low-level occurrence of risk factors, meaning that the environment in these kindergartens is acceptable, but it is still necessary to carry out a number of organizational and technical changes.

Two kindergartens were classified as having middle-level occurrence of risk factors, meaning that the environment does not fulfil the criteria for a healthy kindergarten. More extensive measures need to be carried out to correct this situation.

The main achievements of the programme were:

- evaluation of indoor air pollution in the kindergartens
- preparation and implementation of guidelines for practical measures to reduce exposure to environmental factors in kindergartens
- preparation and distribution of leaflets for teachers and parents
- increase in knowledge of teachers and parents about indoor air risk factors

In 2008 (three years after the initial visit), all ten kindergartens were revisited, and a second round of sampling took place. The implementation of the recommended activities had been achieved by means of "house rules" for kindergarten environment maintenance, which were approved by a regional hygienist for each kindergarten. Each kindergarten underwent organizational changes in line with the house rules. Concentrations of dust mite allergens higher than the limit of 0.6 mg guanine/1g dust were found in 15% of the monitored kindergartens during the summer months and in 35% during the winter months. More extensive measures were not carried out due to financial limitations.

This work is being expanded to other kindergartens and student housing. Continuous improvements in health education and health information are also taking place.

Lessons learned:

Key factors leading to success:

The collaboration between the education and environment sectors in the district, the institutional support and teamwork among public health professionals, and the support of kindergarten directors, teachers and parents were the key factors in the programme's success.

Sustainability:

There is a plan in place to continue programme activities.

Challenges:

- initial lack of interest in environmental health among the general population, including people involved in this project (teachers, school administrators, parents and kindergarten staff)
- inaccurate data on the prevalence of asthma and allergies at district level

Transferability:

Assessing problems like moisture, ventilation, temperatures and moulds by means of sampling and measurement; and the preparation of health education materials for teachers and other school staff, parents and pupils are easily transferable elements of the programme.

Considerations for future implementation or duplication of programme:

- Nominate a capable, experienced person to supervise implementation and sustain momentum.
- Monitor requests and queries regarding the issue of asthma and allergies.
- Spread more public information about project activities in kindergartens.

- Have a national coordinator and a consultant available for scientific and emerging questions.
- Cooperate with the Institute of Health Statistics.
- Arrange for programme staff to be trained in the measurement and sampling method of the microbiological and biological health risk factors and exposure assessment.

Additional information:

The following scientific publications from other projects were very useful:

- ISAAC Steering Committee: International Study of Asthma and Allergies in Childhood (ISAAC). *European Respiratory Journal*, 1998, 12: 315–335.
- Fabianova E et al. Air Pollution and Respiratory Health of Children: CESAR Project in the Slovak Republic. In: Ciznar I, ed. *Proceedings of the International Symposium on Environmental Epidemiology in Central and Eastern Europe: Critical Issues for Improving Health*. Smolenice, Slovakia, The International Institute for Rural and Environmental Health, 1997: 75–79.
- Peat JK. Can Asthma Be Prevented? Evidence from Epidemiological Studies of Children in Australia and New Zealand in the Last Decade. *Clinical and Experimental Allergy*, 1998, 28, 261–265.
- Slotova K et al. Indoor Air Quality in Kindergartens. In: Petras D, ed. *Proceedings of the International Conference on Indoor Climate of Buildings 2007*. Slovak Society of Environmental Technology, December 2007.

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