Children’s Respiratory Health Surveys in Hungary

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National Public Health Center, Hungary
Regional Commitment
European Environment and Health Process

- Children’s Environmental Health Action Plan for Europe
- RPG3: “We aim to prevent and reduce respiratory disease due to outdoor and indoor air pollution, thereby contributing to a reduction in the frequency of asthmatic attacks, in order to ensure that children can live in an environment with clean air.“
- The PARMA Declaration confirmed this commitment and widened it (among others, to child-care settings)
- The Ostrava Conference declared air quality the major health risk in the region and calls to

“Improve indoor and outdoor quality for all”
Respiratory Health Surveys in Hungary

- Assessment of the prevalence of chronic respiratory symptoms
- First survey series between 1996-2003
- Carried out by the National Institute of Environmental Health
- ≈ 20,000 school children (ages 7-11)
- 29 towns and 80 villages all over the country
- Environmental risk factors
  - outdoor and indoor air pollution
  - home environment
  - life-style
  - socio-economic status etc.
National Children’s Respiratory Surveys

• Repeated surveys in 2005, 2010, 2017

• Objectives:
  – To assess the prevalence of chronic respiratory symptoms among school-children as
    • an environmental health indicator
    • a basis of policies and programmes for decreasing respiratory diseases in childhood
  – To identify schools with extreme high or low prevalence of respiratory symptoms and to initiate targeted studies of the school environment
  – To evaluate the health status of the children in relation to their housing environment
Methodology

- Study design: cross sectional
- Study population: all children in 3rd grade classes in every elementary school
  - 2005: 10+ children/class
  - 2010, 2017: every child
- Study area: Hungary (country-wide)
- Questionnaire assessment of exposure and health status through the parents
  - the children’s present and past health status
  - perinatal conditions
  - the parents’ respiratory health
  - smoking habits in the family
  - the home environment
  - socio-economic status of the family
Data management

- Statistics: Multiple logistic regression (STATA 10.0)
- Adjustment for confounders
  - age, gender
  - mother’s smoking during pregnancy
  - environmental tobacco smoke exposure
  - living density in the home
  - serious lower respiratory tract disease in the first 2 years of life
  - mother’s education
Participation

Coverage: 76.4%  71.8%  ?? (ongoing)
Children with chronic bronchitis symptoms

Questions on bronchitis (cough)

- Does your child usually cough in the morning in autumn-winter season?
- Does your child usually cough during the day or at night in autumn-winter season?
- Did your child cough on most days for at least 3 months consecutively in the last autumn-winter season?
- Does your child usually cough up phlegm when he/she does not have a cold?
Geographic disparities in the prevalence of chronic bronchitis symptoms in 8-10 year old children (2010)

Country mean: 18.8%
Geographic disparities in the prevalence of chronic bronchitis symptoms in 8-10 year old children (2017)
**Questions on ASTHMATIC symptoms**

- Has your child been **woken up at night by wheezing** in the last twelve months?
- Has this child had a **dry cough at night** in the last twelve months, apart from a cold or a chest infection?
- Has this child’s chest sounded **wheezing or whistling** in the last twelve months?
Impact of settlement size on the prevalence of chronic bronchitis symptoms in 8-10 year old children (2010)

<table>
<thead>
<tr>
<th>Population</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;=5,000</td>
<td>21.2***</td>
</tr>
<tr>
<td>5,001-50,000</td>
<td>18.7***</td>
</tr>
<tr>
<td>&gt;50,000</td>
<td>16.8</td>
</tr>
</tbody>
</table>

***p<0.001
Impact of heating/cooking means on chronic bronchitis symptoms

![Bar chart showing the impact of coal/wood use for heating or cooking on chronic bronchitis symptoms.](chart)

- **No coal/wood use**: 15.5%
- **Coal/wood use for heating OR cooking**: 23.7%***
- **Coal/wood use for heating AND cooking**: 31.5%***

aOR = 1.00 (reference)  
aOR = 1.20*** (1.12-1.29)  
aOR = 1.51*** (1.33-1.71)

***p<0.001
Correlation of mould in homes and chronic bronchitis symptoms in 8-10 year old children (2010)

- Any bronchitis symptom: 23.5% in mouldy homes, 16.6% in non-mouldy homes
- Morning cough: 17.1% in mouldy homes, 11.5% in non-mouldy homes
- Day/night cough: 13.9% in mouldy homes, 9.2% in non-mouldy homes
- Cough for >3 months: 6.5% in mouldy homes, 4.2% in non-mouldy homes
- Cough with sputum: 5.9% in mouldy homes, 4.1% in non-mouldy homes
Correlation of mould in homes and asthmatic symptoms in the past 12 months in 8-10 year old children (2010)

- Any asthmatic symptom: 25.1% (Mouldy home) vs. 18.5% (No mould growth)
- Wheezing: 11.9% (Mouldy home) vs. 8.1% (No mould growth)
- Wheezing after exercise: 8.4% (Mouldy home) vs. 5.6% (No mould growth)
- Dry cough at night: 13.2% (Mouldy home) vs. 18.0% (No mould growth)
- Waking up by wheeze: 5.5% (Mouldy home) vs. 3.6% (No mould growth)
Associations between the size of mouldy areas and the prevalence of children with various respiratory and allergic symptoms

![Bar chart showing associations between the size of mouldy areas and the prevalence of children with various respiratory and allergic symptoms. The chart includes bars for Bronchitis symptoms, Asthmatic symptoms, Asthma dg, Allergy dg, and Hay fever, with data points for cm², dm², and m².]
Impact of high traffic in the home area on respiratory and allergic symptoms in 8-10 year old children

- Bronchitis symptoms
- Asthmatic symptoms
- Asthma diagnosis
- Allergy diagnosis
- Hay fever

<table>
<thead>
<tr>
<th>Condition</th>
<th>Low Traffic Density</th>
<th>High Traffic Density</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bronchitis symptoms</td>
<td>16.6%</td>
<td>20.6%</td>
</tr>
<tr>
<td>Asthmatic symptoms</td>
<td>17.6%</td>
<td>22.4%</td>
</tr>
<tr>
<td>Asthma diagnosis</td>
<td>7%</td>
<td>9.3%</td>
</tr>
<tr>
<td>Allergy diagnosis</td>
<td>20.2%</td>
<td>23.3%</td>
</tr>
<tr>
<td>Hay fever</td>
<td>4.5%</td>
<td>5.8%</td>
</tr>
</tbody>
</table>
Prevalence of 8-10 year old children with various respiratory and allergic symptoms living in homes with polluting establishment in the neighbourhood

Adjusted OR:
- Bronchitis symptoms: 1.53
- Asthmatic symptoms: 1.56
- Asthma dg: 1.43
- Allergy dg: 1.31
- Hay fever: 1.46
Smoking in the home of the participating children

<table>
<thead>
<tr>
<th>Year</th>
<th>Percentage</th>
</tr>
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<tbody>
<tr>
<td>1996</td>
<td>45.3%</td>
</tr>
<tr>
<td>1997</td>
<td>38.6%</td>
</tr>
<tr>
<td>1998</td>
<td>35.4%</td>
</tr>
<tr>
<td>2000</td>
<td>34.7%</td>
</tr>
<tr>
<td>2002</td>
<td>33.4%</td>
</tr>
<tr>
<td>2005</td>
<td>26.2%</td>
</tr>
<tr>
<td>2010</td>
<td>23.2%</td>
</tr>
<tr>
<td>2017</td>
<td>11.8%</td>
</tr>
</tbody>
</table>

*CESAR* 12 towns, 6 towns, 3 towns, Budapest - Solymár, NCRHS 1., NCRHS 2., NCRHS 3 - 2 counties.
Impact of indoor smoking on the prevalence of chronic respiratory symptoms in 8-10 year old children

<table>
<thead>
<tr>
<th>0 cigarettes</th>
<th>1-10 cigarettes</th>
<th>11-20 cigarettes</th>
<th>&gt;20 cigarettes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bronchitis symptoms</td>
<td>15.7</td>
<td>18.7</td>
<td>21.1</td>
</tr>
<tr>
<td>Asthmatic symptoms</td>
<td>17.1</td>
<td>19.5</td>
<td>22.7</td>
</tr>
</tbody>
</table>
Impact of other risk factors on chronic bronchitis syndromes

Adjusted OR=

- Adobe (mud) building material: 1.18
- >1.5 persons/room: 1.31
- Plastic floor: 1.21
- Coal/wood fuelled cooker: 1.71
- Frequent insecticide use: 1.76

Without that particular risk factor
With that particular risk factor
Utilization of the results

- As an environmental health indicator (WHO and EHIAs) to detect spatial differences and temporal changes
- Foundation of targeted environmental health studies
- Evaluation of the roles of various environmental risk factors in the occurrence of chronic respiratory symptoms of children
- Regular monitoring of the prevalence of children’s chronic respiratory symptoms in order to observe trends and to establish basis for elaborating appropriate environmental health programmes and evaluating their effectiveness
Thank you for your attention
Questions on COUGH (Bronchitis)

- Does your child usually cough in the morning in autumn-winter season?
- Does your child usually cough during the day or at night in autumn-winter season?
- Did your child cough on most days for at least 3 months consecutively in the last autumn-winter season?
- Does your child usually cough up phlegm when he/she does not have a cold?
Questions on ASTHMATIC symptoms

- Has your child been **woken up at night by wheezing** in the last **twelve months**?
- Has this child had a **dry cough at night** in the last **twelve months**, apart from a cold or a chest infection?
- Has this child **ever had asthma**, diagnosed by a doctor?
- Did this child use **medication** (inhalers or tablets or liquid medicines) in the last **twelve months**?
- Has this child’s chest sounded **wheezing or whistling** in the last **twelve months**?
Questions on ALLERGY

• Is this child allergic to house dust?
  pets?
  pollen?
  food?
  medicine?
  anything else?

• Has a doctor diagnosed this allergy?
Other groups of questions

- Name and postcode of the settlement and the school
- The child’s age, gender, perinatal conditions
- The parents’ respiratory and allergic diseases, smoking
- Characteristics of the home environment (building material, floor and wall coverings, living density, means of heating and cooking, mould growth, pets, nearby traffic and industry, etc.)
- The parents’ education and socio-economic status of the family