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482. Paediatric respiratory epidemiology. Wheeze: where, how and why?

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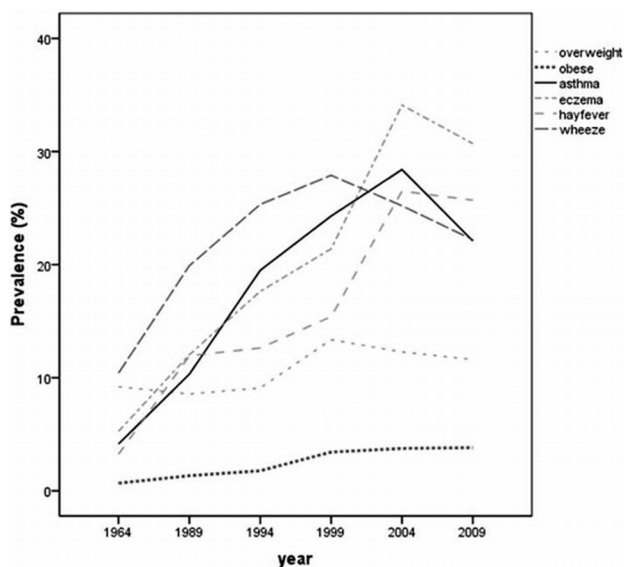
Secular trends in childhood obesity, asthma, eczema and hayfever over 45 years

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Background: The childhood asthma "epidemic" which took place during the 1980s and 1990s is at least partly explained by changes in lifestyle. Childhood obesity prevalence has also risen, reflecting lifestyle changes. Here we tested the hypothesis that the rise in asthma prevalence in the population paralleled that in obesity.

Methods: A history of asthma, hayfever, eczema and wheeze in the last three years was obtained in 1964, 1989, 1994, 1999, 2004 and 2009. Prevalence of overweight and obesity (IOTF BMI cut-offs equivalent to 25 and 30 at age 18 years) were determined from a separate whole population survey of height and weight at school entry in children in Aberdeen and Aberdeenshire born between 1969 and 2005.

Results: Asthma and related outcomes were determined in 17,951 children in the six surveys and in these years height and weight were available in 29,348 children in the separate study. The prevalence of asthma was between 4 and 28%, for eczema between 5 and 34%, for hayfever between 3 and 27%, for recent wheeze between 10 and 28% and for obesity between 1 and 4%. There were correlations between prevalence at each time point for obesity and asthma ($\rho=0.83$, $p=0.042$), eczema ($\rho=0.94$, $p=0.005$) and hayfever ($\rho=0.94$, $p=0.005$) but not for wheeze. There were no correlations between overweight and outcomes.



Conclusions: The simultaneous rise in both obesity and asthma might suggest a common underlying mechanism.

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Comparison of two respiratory surveys in an unselected schoolchildren population: 1998 and 2011

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Objective: To evaluate the prevalence of respiratory symptoms, atopy, and environmental factors in two different populations of Italian schoolchildren studied in 1998 and 2011 in Ronciglione (VT, Italy).

Methods: Data on children was drawn from surveys in the same elementary school 13 years apart. A modified version of the ATS questionnaire for respiratory symptoms was completed by parents that sought on child's history respiratory and smoke exposure. Measurements included spirometry, exhaled nitric oxide, and skin-prick testing. Atopy was defined by at least a positive skin wheal of at least 3 mm.

Results: The 396 children were found similarly distributed by age and sex. (1998 Survey: 9.8 ± 0.7 yr, 86 males; 2011 Survey: 9.3 ± 0.9 yr, 111 males). Also similar were the prevalence of reported asthma diagnosis (1998: 13% vs 2011: 10.1%), exercise-induced asthma, rhinitis, wheeze or cough in the past 12 months and smoke exposure. The 2011 Survey yielded a significant increase of bronchitis in the last 12 months (42.9% vs 14.6%, $p=0.000$), borderline for pneumonia (4.5% vs 1.0%, $p=0.067$). Prevalence of atopy in 2011 was similar to that of 1998 (32.3% vs 25.8%). No different functional measurements were observed.

Conclusion: Our data do not support an increase of asthma prevalence among schoolchildren of central Italy in the past 13 years. The concomitant mild decrease of reported asthma and the increase of bronchitis in 2011 could be explained by a shift in medical criteria and parent's disease perception.

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Elective caesarean section affects the risk of asthma medication in children up to five years of age

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It has been hypothesized that elective caesarean section is related to an increased risk of asthma due to lack of labour and delayed microbial colonization. Few studies have distinguished between elective and emergency caesarean sections and the findings have not been consistent. Some studies have also observed a risk associated with vacuum extraction.

Method: We examined the association between mode of delivery and retrieval of asthma medication in a register based national cohort ($n=205,540$). Unconditional logistic regression models were used in an analysis of all first born children aged 2-5 and 6-9 years for the outcome of inhaled steroid (ICS) use while adjusting for potential confounders. An age-matched sib-pair analysis was also performed, taking into account shared genetic and environmental risk factors.

Results: Analyses of first-borns demonstrated that elective caesarean section was associated with an increased risk of ICS use in both age groups. The increased risk remained in the sib pair analysis of 2-5 year olds ($OR=1.21$) and was partly explained by shorter period of gestation ($aOR=1.12$). The sib pair analysis could not confirm any association between elective caesarean section and ICS use in 6-9 year olds. Emergency caesarean section and vacuum extraction had some association with asthma medication in the analyses of first-borns but all associations disappeared in the sib pair analyses.

Conclusion: Elective caesarean section contributed to a modestly increased risk of asthma medication up to five years of age. The associations between emergency caesarean section or vacuum extraction and asthma medication in the firstborns could be caused by residual confounding.

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Pregnancy complications and respiratory outcomes in very preterm infants

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Very preterm infants have a high mortality and morbidity, due to a combination of

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immaturity per se, and of the underlying pathology causing preterm birth. The role of prenatal infection on increasing the risk of bronchopulmonary dysplasia (BPD) is still unsettled.

Aim: To test the hypothesis that infection/inflammation disorders (I) (prelabor premature rupture of membranes, spontaneous preterm labor, infection and hemorrhage) and hypertensive disorders (H) (maternal hypertension and intrauterine growth restriction) are differently associated to in-hospital mortality and BPD.

Methods: A population-based prospective cohort of 2085 singleton infants 23 to 31 weeks gestational age (GA) born in 6 Italian regions in 2003-2005 (ACTION study), was analyzed.

Infants born of mothers with H (31%) were contrasted with those born after I (63%) with respect to mortality and BPD. Multivariable logistic analyses (generalized estimating equations) were used.

Results: Mortality was 14.3%, with 48.7% of deaths occurring in the first 5 days of life, largely due to respiratory causes. Infants born after H had more respiratory distress syndrome than the I group (odds ratio (OR)= 1.41, 95% confidence interval (CI): 1.1-1.8, adjusted for GA, sex and antenatal steroids). 12.8% of neonates had BPD. After adjustment for GA, H disorders had a higher risk of mortality (OR=1.4; 95% CI:1.0, 2.0) and of BPD (OR=2.5; CI: 1.8, 3.6). Further adjustment for maternal age, education, citizenship, and antenatal steroids did not change results.

Conclusions: Our results support the hypothesis that pathogenetic mechanisms involving the regulation of lung/airways size and vessels are more important than I in the development of BPD.

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Paracetamol in pregnancy and risk of wheezing in offspring: Causation or bias?

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Background: Many but not all studies have suggested an association between paracetamol (P) use in pregnancy and wheezing in childhood.

Objective: To assess the relationship between P use in pregnancy and wheezing in offspring, in an Italian mother and child cohort (NINFEA cohort, www.progettoninfea.it). To evaluate the potential role of confounding by indication of P use.

Methods: Infants born from 1076 mothers who used P were contrasted with those born from mothers with no use of P (701) with respect to wheezing at 6-18 months of life. P use was assessed during pregnancy and 6 months after delivery, while wheezing was assessed 18 months after delivery.

Results: The overall prevalence of wheezing was 25% and it was more common among infants exposed to P in pregnancy (Relative risk (RR)=1.23, 95% confidence interval (CI): 0.98-1.54). Adjustment for ever diagnosis of maternal asthma (prevalence: 7.6%) did not change the association. After further adjustment for maternal respiratory diseases in pregnancy (asthma episodes, influenza like illness, bronchitis), maternal smoking and education, child sex and siblings, the RR for wheezing was 1.06 (CI: 0.84-1.34). When we analyzed women who suffered from headache, migraine or backache versus all the others, the risk of wheezing in offspring was similar for mothers who used and for those who did not use P in pregnancy for these diseases (RR 1.28; CI: 0.85-1.91 versus 1.35; 1.03-1.76).

Conclusions: The weak association found between P use in pregnancy and wheezing in offspring disappeared after adjustment, raising a problem of confounding. A non-causal relationship is also suggested by the lack of increased risk of wheezing for P use in "non-respiratory" diseases.

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How do patterns of wheeze change over the first 14 years of life?

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Aim: Only few studies described changes in clinical patterns of wheeze in children over a wide age range. This study aimed to describe reported symptom patterns in children with wheeze from age 1 to 14 yrs, focusing on indicators of wheeze severity and triggers of attacks.

Methods: In a population-based cohort study in Leicestershire, UK, we assessed prevalence of parent-reported wheeze and associated symptoms at ages 1, 2, 4, 6, 9 and 14 yrs. We analyzed variables related to severity (frequency of wheezing attacks, shortness of breath, sleep disturbance and activity disturbance due to wheeze) and triggers of wheeze (colds, exercise, food, contact with aeroallergens) in the past 12 months.

Results: The prevalence of wheeze decreased from 36% (1446/4035) at age 1 to 16% (471/3003) at age 6 years and remained stable thereafter. Among children with wheeze the proportion with frequent attacks (≥ 4) changed little from age 1 (35%) to 14 years (32%) and so did prevalence of activity disturbance, sleep disturbance, wheeze associated with colds and food-induced attacks. In contrast, the following symptoms became more frequent with increasing age: shortness of

breath (increasing from 54% at age 1 to 85% at age 14), wheeze apart from colds (32% to 61%), exercise-induced attacks (26% to 71%) and aeroallergen-induced wheeze (6% to 50%).

Conclusion: We found significant age-related changes in wheezing patterns from infancy to adolescence. When designing questionnaires and planning studies, such differences in patterns of wheezing illness by age should be taken into account.

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Automated identification of asthma patients within an electronic medical record database using machine learning

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Background: Use of electronic medical record (EMR) databases for epidemiological research on asthma/COPD is increasing. A key challenge for use of these huge databases is disease validation. The conventional method is labor intensive and often non-systematic. One strategy to address this, is the use of machine learning (ML) to identify cases.

Aim: To investigate the performance of ML in the automated identification of children with asthma.

Methods: From the IPCI database, a GP database with medical records of > 1 million patients, all potential asthma patients, aged 6-18 years between 2000-2011, were identified with a broad automated search on asthma codes, free text and asthma drugs. First, a random sample (n=5039) of all potential cases (n=64327) was manually reviewed by 2 MDs and categorized according to a predefined algorithm. Second, based on this sample set, ML recognizes complex patterns to automatically generate decision trees for case identification. Training and testing was done by 5-fold cross validation.

Results: The sample set consisted of 6% definite, 24% probable, 2% doubtful cases and 68% non-cases. Depending on the sampling strategy, the positive predictive value (PPV) varies from 0.11-0.26, sensitivity (Sn) 0.57-0.94 and specificity (Sp) 0.52-0.89 for definite cases (diagnosis by specialist). For probable cases (diagnosis by GP) PPV varies from 0.49-0.51, Sn 0.84-0.86 and Sp 0.69-0.73.

Conclusion: ML for automatic identification of asthma cases in a huge EMR database performs well. The optimal ML method depends on the research question e.g. incidence/prevalence studies require a method with a large Sn, while outcome studies require a large Sp.

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Persistent wheezing after bronchiolitis: 5 years of follow-up

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Introduction: We have previously demonstrated the association between bronchiolitis from Rhinovirus (RV) and recurrent wheezing after 1 yr follow-up

Aims and methods: Identify risk factors for persistent wheezing (PW) after 5 yrs follow up in 162 infants (median age 2.0 m, range 7 d-11 m, 94 males) hospitalized with bronchiolitis from Respiratory Syncytial Virus (RSV), RV, Bocavirus (hBoV), Influenza A and B, Parainfluenza 1-3, Metapneumovirus, Adenovirus and Coronavirus detected from nasal washes with RT-PCR. Demographic and clinical data were obtained with a structured questionnaire and from patient's medical files.

Results: After 5 yrs follow-up 99 (61.1%) families answered to phone calls. Children were divided in: never wheezing (NW, n=33), transient wheezing (TW, n=31) and PW (n=26). The percentage of children with an absolute number of blood eosinophils greater than 400 cells/ μ l was higher in children with PW than in those with TW and NW (0, 0, 11.4%; p<0.02). The percentage of children with blood CRP concentration lower than 0.8 mg/dl and absence of chest X ray consolidations differed between children with PW, TW and NW (48.5% vs 60% vs 74.3%; p<0.03 and 11.1% vs 17.9% vs 31.4%; p<0.06). 17.1% of children with PW had bronchiolitis from RV comparing to 6.5% of children with TW and 3% of children who NW (p<0.06). 66.7% of infants with bronchiolitis from RV developed PW comparing to 50% of infants with bronchiolitis from hBoV, 27% of infants with bronchiolitis from RSV and 12.5% of infants with bronchiolitis from RSV+hBoV.

Conclusions: Atopic predisposition and RV infection seem to predict which infant will have PW after bronchiolitis.

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P4657**Asthma and respiratory morbidity thirty years after early childhood bronchiolitis or pneumonia**

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Background: Recent studies have suggested that asthma in adulthood has its origin in early childhood.

Aims: To evaluate asthma occurrence and respiratory health related quality of life in adults after bronchiolitis or pneumonia in infancy.

Methods: A group of patients were followed since hospitalized for bronchiolitis or pneumonia at age <24 months in 1981-82. At the age of 28-31 yrs, data on respiratory symptoms was collected by a posted questionnaire and Saint George's respiratory questionnaire (SGRQ), from 60/78 former bronchiolitis and 24/46 pneumonia patients, and from 166 matched controls. The clinical study consisted of bronchodilatation test and home peak expiratory flow monitoring; 48(62%) and 22(48%) study subjects and 138 controls attended. Asthma was defined by two ways: current doctor-diagnosed and current self-reported (childhood asthma and current asthma-suggestive symptoms in adulthood; doctor diagnosed asthma included).

Results: Both current doctor-diagnosed asthma (31.9% vs. 11.6%; adjusted p=0.003) and self-reported asthma (36.2% vs. 15.2%; 0.004), as well as repeated on-demand use of bronchodilators (35.4% vs. 14.5%; 0.002) and regular use of inhaled corticosteroids (20.8% vs. 8.7%; 0.023) were more common in the former bronchiolitis group than in controls. Both former bronchiolitis and pneumonia patients had higher total scores in SGRQ than controls: bronchiolitis (median 4.3, IQR₂₅₋₇₅ 0.9-8.3; p<0.001), pneumonia (4.9, 1.5-15.5; 0.002), controls (1.0, 0-5.3).

Conclusion: After hospitalization for bronchiolitis in infancy, an increased risk of asthma, more use of asthma medication and impaired quality of life by SGRQ can be demonstrated in adults at age 28-31 yrs.

P4658**Viral etiology of respiratory infections in children under 2 years old in Blida, Algeria**

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Acute respiratory infection (ARI) is a leading cause of morbidity and mortality in children especially in developing countries. Viruses are known as the predominant causative agents of ARI. In Algeria, few data concerning these agents are available. The aim of our study was to investigate the incidence of 10 viruses in children under 2 years old admitted with ARI and to study demographic and clinical differences among different virus.

Methods: Children were prospectively enrolled between December 2010 and April 2011. A standardized questionnaire was used and a nose swab sample was collected. These samples were tested for the detection of RSV, Influenza virus (A/B), hRhinovirus, hMetapneumovirus, hCoronavirus, Adenovirus, Parainfluenza 1-3 by RT-PCR. Demographic, clinical and laboratory data were obtained. Outcome measurements were age, breastfeeding history, clinical severity score, chest radiological findings.

Results: 117 children, median age 3 months, were recruited. A virus was detected in 82.9% of cases. The most frequently detected viruses were RSV (48%), hRhinovirus (23%), hMetapneumovirus (22%), Adenovirus (7.5%), Influenza (5%), parainfluenza 3 (2.5%). Co-infections were detected in 25 children (21.4%). Clinical features associated with RSV infection were similar to those of other respiratory viruses. Presenting symptoms between the RSV positive and RSV negative groups were similar.

Conclusion: This study underlines the importance of viral pathogens in ARI hospitalized children < 2 years old. RSV was the most frequently identified virus. HMPV and RV are also important cause of ARI in children in Algeria. Longer surveillance studies are needed to better understand the epidemiology of viral ARI.

P4659**Wheezing and pneumonia during the first year of life: An international epidemiological approach**

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Aims: To investigate risk factors of bronchopneumonia (BP) in wheezing (WZ)

or non-WZ infants (at least 1 episode) in the "Estudio Internacional de Sibilancias en Lactantes" (EISL).

Methods: EISL methods were described previously (Thorax 2010;65:1004-9). Briefly, parents from 22 centres (14 Latin American and 8 European) answered a validated questionnaire (Int Arch Allergy Immunol 2007;144:44-50) on wheezing and risk factors during the 1st year of life of their children. They were grouped as BP+WZ+; BP+WZ-; BP-WZ+; and BP-WZ- (comparator). Associations (aOR 95%CI) were tested using multivariate random-effects logit models, with centre as the panel variable.

Results: Infants grouped: BP+WZ+ 3415; BP+WZ- 913; BP-WZ+ 11688; BP-WZ- 18659. Among WZ+, BP was less likely to occur when correctly vaccinated (aOR: 0.68; 0.54-0.85 vs 0.90; 0.77-1.04). Among BP+, risk factors were different depending on WZ (table)

	BP+ WZ+	BP+ WZ-
Parental eczema	1.19 (1.08-1.33)	0.99 (0.83-1.18)
Infant eczema	1.63 (1.49-1.79)	1.12 (0.96-1.31)
Mother smoked in pregnancy	1.66 (1.44-1.90)	0.77 (0.62-0.96)
Attended nursery school	2.63 (2.33-2.97)	1.11 (0.91-1.37)
Breast feeding 3+ months	0.78 (0.71-0.86)	1.39 (1.19-1.63)
Per additional sibling	1.06 (1.03-1.10)	0.96 (0.91-1.00)
Per additional person at home	1.05 (1.03-1.07)	1.00 (0.97-1.03)
Mould stains in household walls	1.52 (1.38-1.67)	1.12 (0.94-1.32)
University studies in mother	0.71 (0.64-0.78)	1.37 (1.15-1.62)
Pets at home	0.90 (0.83-0.99)	1.04 (0.89-1.22)
Birth weight (per additional gram)	0.94 (0.88-1.01)	1.13 (1.00-1.28)
Correct vaccination schedule	0.68 (0.54-0.85)	1.10 (0.73-1.65)

Conclusions: In infants who had BN during the 1st year of life, there are some risk factors which are different for WZ+ and WZ-.

P4660**Risk factors for severe bronchiolitis – A retrospective study**

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Introduction: Bronchiolitis is a common disease in children under 2 years old causing ER presentation and sometimes admission. Severity of bronchiolitis (do to acute respiratory failure) accounts for admission criteria. Children with one or more risk factors for severe bronchiolitis (prematurity, dysmaturity, environmental factors, neurological disease, cardiac disease, airways anomalies, immune deficiency, chronic lung disease, age under 3 months, formula feeding, RSV infection) are among those usually admitted.

Objectives: To reveal the correlation between admissions do to bronchiolitis and the presence of the risk factors.

Methods: A retrospective study was conducted, including 96 children under 2 years old, admitted in our hospital between November 2011 and January 2012. The admission criteria were Wang severity score for bronchiolitis (over 6). We have correlated the hospitalization lasting more than 5 days and/or the Wang score for severity over 10 with the number of risk factors.

Results: All 96 children admitted had at least one risk factor for severe bronchiolitis. Children with Wang score over 10 and hospitalization lasting more than 5 days (34 children) associated at least 2 risk factors, most frequent of them being crowded living condition (94%), male sex (73.5%), prematurity (50%), age under 3 months (47%) and other comorbidities (29%).

Conclusion: Severity of bronchiolitis correlates with number of risk factors that coexist for the same child.

P4661**Correlation between nasal symptoms and lung function parameters in preadolescent children**

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Introduction: Allergic rhinitis is a frequent medical condition worldwide and it also influences considerably the children's performance at school.

Aim: Correlation between the ISAAC (International Study of Asthma and Allergies in Childhood) questionnaire's data and respiratory system functional parameters in children between 10 and 12 years old.

Methods: Parents of elementary school pupils in the Municipality of Polichni, Thessaloniki, Greece were asked to fill in the ISAAC questionnaire. All students underwent spirometry, rhinomanometry, IgE and eosinophils in the peripheral blood, fraction of exhaled NO (FeNO) and skin prick tests. The control group consisted of those children with no rhinitis symptoms.

Results: 1150 children of 11 elementary schools were included in the study. 971 questionnaires were completed (participation rate: 84.4%). One hundred forty four students had at least one positive answer regarding rhinitis (14.8%). Of those, 20.8% presented with elevated IgE levels, 25.4% had increased blood eosinophils, 20.8% had high FeNO (>20ppb) and 45.1% had at least one positive skin prick test. Body mass index was higher in the rhinitis group (21.1±3.3 vs 20.1±1.8

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kg/m², $p=0.019$), while the spirometric and rhinomanometric data did not differ between the rhinitis and the control group. ISAAC questionnaire's score was positively correlated with IgE concentration ($p=0.002$), eosinophils ($p=0.037$) and the number of positive skin prick tests ($p<0.001$).

Conclusion: Our study showed significant positive correlation between the ISAAC questionnaire's data and allergic parameters. Therefore the ISAAC questionnaire is strongly recommended as a useful tool in primary pediatric care practice.

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Belarus Ukraine Poland Asthma Study (BUPAS) – Prevalence of asthma, respiratory symptoms and allergic diseases in children

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Background: Prevalence of asthma and other allergic diseases in children living in Belarus is unknown. The problem is better described in Ukraine and Poland, but more evidence is needed.

Aims: The objective of the study was to estimate the prevalence of asthma, respiratory symptoms and allergic diseases in children in Belarus, Ukraine and in Poland.

Method: The study was performed as a multicenter cross-sectional study. The study population were children aged 6-14 years randomly selected from Belarus (Grodno), Ukraine (Ternopil) and Poland (Silesia Region). Physician-diagnosed respiratory diseases and symptoms as well as allergic diseases were ascertained using the ISAAC questionnaire completed by the parents.

Results: A total of 13 371 children aged 6-14 years participated in the study. The response rate was 76.7%. Groups were similar in terms of gender and age ($p>0.05$). Between-country differences were statistically significant ($p<0.05$) for all conditions, except chronic and spastic bronchitis as well as hay fever in case of Ukraine/Bielarus comparisons.

Disease/symptom	Belarus (n=4668)	Ukraine (n=4752)	Poland (n=4525)
Asthma (dgn)	1.4%	2.1%	4.3%
Chronic bronchitis (dgn)	11.7%	11.6%	18.1%
Spastic bronchitis (dgn)	6.9%	6.8%	2.9%
Hay fever (dgn)	3.7%	3.8%	18.7%
Atopic dermatitis (dgn)	10.4%	6.8%	9.7%
Any allergy (dgn)	14.5%	12.7%	20.2%
Chest wheeze – last year	9.8%	16.6%	15.1%
Attacks of dyspnea after exertion – last year	3.9%	6.3%	4.2%

Conclusions: The findings show a large between-country differences and low prevalence of asthma and allergic diseases in children of Western Belarus and Ukraine.

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Allergic diseases in urban/rural environment: Are there differences in diet, body mass index and physical activity?

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Background: Higher prevalence rates of allergic diseases in urban, compared to rural, area have been reported and investigated through different hypotheses. The aim of the study was to explore the association of asthma, allergic rhinitis, and eczema with diet, BMI, and physical activity in the both areas.

Methods: International Study of Asthma and Allergies in Childhood Phase 3 questionnaires were self-completed by 5507 adolescents aged 12-16 years from 8 cities and surrounding villages in R. Macedonia and used for the analysis. Chi-square test was employed to test for statistical significance in comparisons between urban/rural prevalence rates of current and ever-diagnosed asthma, allergic rhinitis, eczema and current frequent intake of 15 dietary products, BMI, TV-watching/PC-playing time daily.

Results: In adolescents from urban, compared to rural, area significantly higher prevalence of current wheeze (7.2% vs. 4.9%, $p=0.03$) and non-significantly higher prevalence rates of ever-diagnosed asthma, current and ever-diagnosed allergic rhinitis and eczema were established. Adolescents from urban, compared to rural, area reported higher intake of milk (53.8% vs. 42.7%, $p=0.00$), butter (16.4% vs. 12.8%, $p=0.04$), and margarine (24.1% vs. 15.6%, $p=0.00$) and lower intake of fish (5.1% vs. 8.7%, $p=0.00$), and rice (8.0% vs. 12.3%, $p=0.00$) as well

higher prevalence of TV-watching/PC-playing time ≥ 3 hours daily (39.1% vs. 28.8%, $p=0.00$).

Conclusion: As the diet and sedentary lifestyle may contribute to higher asthma, allergic rhinitis and eczema prevalence rates, adequate diet and regular physical activity should be propagated among young adolescents living in urban area.

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Chest pain in children – Evaluation of 136 consecutive cases

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Chest pain (CP) is a common complaint among children. In many cases the source of pain can be identified by a thorough history and physical examination. Further diagnostic evaluation is warranted in doubtful cases.

Aim: To identify the causes of CP in children referred to the emergency department (ED) and to compare results with the published data.

Methods: All cases referred to ED for CP in one year period (2010-11) were retrospectively analyzed. Causes of CP were divided in: cardiac-related and noncardiac-related, the latter being further subdivided in: idiopathic (IC), musculoskeletal (MC), respiratory (RC), gastrointestinal (GC) and miscellaneous (MSC) causes. The results were compared with data from the literature.

Results: Records from 136 children (66 girls), mean age 12.2 years ($SD\pm 3.7$ years), were included. The most frequent group - 55 (40.4%) had IC, followed by MC in 35 (25.7%) children. RC were present in 17 (12.5%), GC in 13 (9.6%), and MSC in 6 children (4.4%). Our results in all groups did not differ from data in other studies. Cardiac causes were present in 10 children (7.4%), which is in line with up to 15% of cases in published data. Potentially fatal conditions were diagnosed in 6 (4.4%) children. None died or suffered significant sequelae.

Conclusion: Our results are in line with published data from major centers. Benign conditions represent the majority of causes of CP. Nevertheless, CP in children should be evaluated with care since potentially fatal conditions can also be present in this age group.

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Predisposing factors for recurrent wheezing in toddlers

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Background: Recurrent wheezing is frequently found among toddlers and obesity seems to be associated with asthma. In our country early introduction of wheat products in infant's alimentation is a habit, associating obesity/paratropy and vitamin D deficiency. The aim of the study is to evaluate the relationship of mentioned factors with recurrent wheezing in a pediatric group without positive familial history of asthma.

Methods: Seventy four preschool children (2-5 years), with median age 2.8 years, monitored for recurrent wheeze (more than 4 episodes per year) were included in the study. Retrospective analysis about feeding period, vitamin D supplementation and history of rickets was done. Specific diet anamnesis regarding early introduction of wheat products (before 8 months) was obtained by individual questionnaire. During two summer months, we assessed nutritional status, vitamin D levels and calcium metabolism; investigating also the association of cow's milk allergy.

Results: A considerable percent of 70.27% of wheezing children had a strong association with early introduction of wheat products in diet, 65.38% of them associating obesity. Paratrophic children with wheezing were also deficient in vitamin D (64.7%). In seventeen children (16.36%) we found rickets sequelae, despite vitamin D supplementation, according our national recommendations. Cow's milk allergy was found in 32.43% children.

Conclusion: Early introduction of wheat products in children alimentation predisposes to obesity associating vitamin D deficiency. Exchange of alimentary tradition and vitamin D supplementation might have a positive role in preventing the recurrent wheezing.

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Occurrence of obstruction of respiratory tracts among acute respiratory diseases in children hospital

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Acute respiratory infections (ARIs) are the most common diseases among children and adults in Russia. Persistent wheezing and laryngotracheitis occupy the leading part among ARIs in children of early age.

The aim of our work was to evaluate occurrence of obstruction of respiratory tract among acute respiratory diseases in children's hospital.

Methods: We performed a retrospective analysis of histories of children admitted at Department of respiratory infections of Saint Vladimir Childrens City Hospital in 2006-2007 and 2010-2011 years.

Results: Our cohort included children with ARIs aged from 1 months to 15 years old (in 2006 - 2220, 2007 - 2455, 2010 - 3200, 2011 - 2960 children). Children with obstruction were mainly early age (from 1 months to 3 years old). We revealed

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high frequency of obstruction upper and lower respiratory tracts, most of these children had recurrent episodes in history.

We have found reduction frequency of wheezing in different years of observation from 23.1% to 21.5% (2006 – 23.1%, 2007 – 38.3%, 2010 – 39%, 2011 – 21.5% of children with AIRs). Also we registered high occurrence children with obstructive laryngotracheitis (in 2006 – 42.5%, 2007 – 65.7%, 2010 – 50.4%, 2011 – 47% of children with AIRs). All children with obstruction received standard treatment.

Conclusion: Reduction of frequency of wheezing and obstructive laryngotracheitis in children admitted at children's hospital is connected with introduction of modern principles of therapy obstruction of respiratory tract at a pre-hospital stage.