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Paediatric Allergy

Evidence Update

November 2017

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Training Calendar 2017

All sessions are one hour

November (13.00)

2nd Thu	**Literature Searching**
10th Fri	**Critical Appraisal**
13th Mon	**Statistics**
21st Tues	**Literature Searching**
29th Wed	**Critical Appraisal**

December (12.00)

7th Thu	**Statistics**
15th Fri	**Literature Searching**

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Journal Tables of Contents

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Allergy

November 2017, Volume 72, Issue 11

Clinical & Experimental Allergy

October 2017, Volume 47, Issue 10

Journal of Allergy and Clinical Immunology

October 2017. Volume 140, Issue 4

Pediatric Allergy and Immunology

September 2017. Volume 28, Issue 6

Epidemiology

Growth curves of “normal” serum total IgE levels throughout childhood: A quantile analysis in a birth cohort (pages 525–534)

Chiara Sacco, Serena Perna, Donatella Vicari, Marco Alfò, Carl-Peter Bauer, Ute Hoffman, Johannes Forster, Fred Zepp, Antje Schuster, Ulrich Wahn, Thomas Keil, Susanne Lau and Paolo Maria Matricardi

The validity of register data to identify children with atopic dermatitis, asthma or allergic rhinoconjunctivitis (pages 535–542)

Lone Graff Stensballe, Lotte Klansø, Andreas Jensen, Ann Hærskjold, Simon Francis Thomsen and Jacob Simonsen

Skin & Eye

An association of periostin levels with the severity and chronicity of atopic dermatitis in children (pages 543–550)

Myongsoon Sung, Kyung Suk Lee, Eun Gyo Ha, Seung Jin Lee, Mi Ae Kim, Seung Won Lee, Hye Mi Jee, Youn Ho Sheen, Young Ho Jung and Man Yong Han

Impact of solar ultraviolet radiation on atopic dermatitis symptoms in young children: A longitudinal study (pages 551–556)

Young-Min Kim, Jihyun Kim, Ji Young Lee, Minji Kim, Hyunmi Kim, Kwon Jung, Soomi Eo, Mijin Ahn and Kangmo Ahn

Asthma

Prednisolone for the first rhinovirus-induced wheezing and 4-year asthma risk: A randomized trial (pages 557–563)

Annamari Koistinen, Minna Lukkarinen, Riitta Turunen, Tytti Vuorinen, Tero Vahlberg, Carlos A. Camargo Jr, James Gern, Olli Ruuskanen and Tuomas Jartti

Breastfeeding and the risk of childhood asthma: A two-stage instrumental variable analysis to address endogeneity (pages 564–572)

Nivita D. Sharma

Efficacy and safety of tiotropium in school-age children with moderate-to-severe symptomatic asthma: A systematic review (pages 573–578)

Gustavo J. Rodrigo and Hugo Neffen

Clinical Immunology

The role of vitamin D on circulating memory T cells in children: The generation R study: (pages 579–587)

Kirsten I.M. Looman, Michelle A.E. Jansen, Trudy Voortman, Diana van den Heuvel, Vincent W.V. Jaddoe, Oscar H. Franco, Menno C. van Zelm and Henriëtte A. Moll

Food Allergy

Neonatal BCG has no effect on allergic sensitization and suspected food allergy until 13 months (pages 588–596)

Lisbeth Marianne Thøstesen, Henrik Fomsgaard Kjaer, Gitte Thybo Pihl, Thomas Nørrelykke Nissen, Nina Marie Birk, Jesper Kjærgaard, Aksel Karl Georg Jensen, Peter Aaby, Annette Wind Olesen, Lone Graff Stensballe, Dorthe Lisbeth Jeppesen, Christine Stabell Benn and Poul-Erik Kofoed

Journal of Allergy and Clinical Immunology

October 2017 Volume 140, Issue 4, p895-1216

Role of viral infections in the development and exacerbation of asthma in children

Tuomas Jartti, James E. Gern

p895–906

Promising approaches for the treatment and prevention of viral respiratory illnesses

Nikolaos G. Papadopoulos, Spyridon Megremis, Nikolaos A. Kitsioulis, Olympia Vangelatou, Peter West, Paraskevi Xepapadaki

p921–932

Reduced need for surgery in severe nasal polyposis with mepolizumab: Randomized trial

Claus Bachert, Ana R. Sousa, Valerie J. Lund, Glenis K. Scadding, Philippe Gevaert, Shuaib Nasser, Stephen R. Durham, Marjolein E. Cornet, Harsha H. Kariyawasam, Jane Gilbert, Daren Austin, Aoife C. Maxwell, Richard P. Marshall, Wytske J. Fokkens

p1024–1031.e14

Experimental Allergy and Immunology

BTK inhibition is a potent approach to block IgE-mediated histamine release in human basophils (pages 1666–1676)

D. Smiljkovic, K. Blatt, G. Stefanzl, Y. Dorofeeva, C. Skrabs, M. Focke-Tejkl, W. R. Sperr, U. Jaeger, R. Valenta and P. Valent

Natural tolerance development in cow's milk allergic children: IgE and IgG4 epitope binding (pages 1677–1685)

J. C. Caubet, J. Lin, B. Ahrens, G. Gimenez, L. Bardina, B. Niggemann, H. A. Sampson and K. Beyer

AhR mediates an anti-inflammatory feedback mechanism in human Langerhans cells involving FcεRI and IDO (pages 1686–1693)

S. Koch, T. J. Stroisch, J. Vorac, N. Herrmann, N. Leib, S. Schnautz, H. Kirins, I. Förster, H. Weighardt and T. BieberGetIt@Leiden

RNase 7 downregulates TH2 cytokine production by activated human T cells(pages 1694–1703)

V. Kopfnagel, S. Wagenknecht, L. Brand, J. Zeitvogel, J. Harder, K. Hofmann, M. Kleine and T. Werfel

Protease-activated receptor-2 suppresses interleukin (IL)-10 expression in B cells via upregulating Bcl2L12 in patients with allergic rhinitis (pages 1704–1712)

J.-M. Xue, L.-T. Yang, G. Yang, X.-R. Geng, Z.-Q. Liu, S. Wang, H.-L. Zhao, Z.-G. Liu, C.-Q. Zhao and P.-C. Yang

Topical corticosteroid phobia in atopic dermatitis: International feasibility study of the TOPICOP score (pages 1713–1719)

J.-F. Stalder et al

Effect of anti-IgE in occupational asthma caused by exposure to low molecular weight agents (pages 1720–1727)

M. Ollé-Monge, M.J. Cruz, S. Gomez-Ollés, I. Ojanguren, J. Vanoirbeek and X. Muñoz

Airway Diseases

Altered fatty acid metabolism and reduced stearoyl-coenzyme a desaturase activity in asthma (pages 1744–1752)

N. Rodriguez-Perez, E. Schiavi, R. Frei, R. Ferstl, P. Wawrzyniak, S. Smolinska, M. Sokolowska, N.A. Sievi, M. Kohler, P. Schmid-Grendelmeier, D. Michalovich, K.D. Simpson, E.M. Hessel, M. Jutel, M. Martin-Fontecha, O. Palomares, C.A. Akdis and L. O'Mahony

Clinical, functional and inflammatory characteristics in patients with paucigranulocytic stable asthma: Comparison with different sputum phenotypes(pages 1761–1767)

P. Ntontsi, S. Loukides, P. Bakakos, K. Kostikas, G. Papatheodorou, E. Papathanassiou, G. Hillas, N. Koulouris, S. Papiris and A. I. Papaioannou

Skin and Eye Diseases

Children with atopic dermatitis and frequent emollient use have increased urinary levels of low-molecular-weight phthalate metabolites and parabens (pages 1768–1777)

L. E. K. Overgaard, K. M. Main, H. Frederiksen, S. Stender, P. B. Szecsi, H. C. Williams and J. P. Thyssen

Transcriptome analysis of severely active chronic spontaneous urticaria shows an overall immunological skin involvement (pages 1778–1790)

Giménez-Arnau, L. Curto-Barredo, L. Nonell, E. Puigdecanet, J. Yelamos, R. Gimeno, S. Rüberg, L. Santamaria-Babi and R.M. Pujol

Clinical & Experimental Allergy

November 2017 Volume 47, Issue 11

Asthma and Rhinitis

Patient-reported signs of dampness at home may be a risk factor for chronic rhinosinusitis: A cross-sectional study (pages 1383–1389)

Ahlroth Pind, M. Gunnbjörnsdottír, A. Bjerg, B. Järvholm, B. Lundbäck, A. Malinovschi, R. Middelveld, J. Nilsson Sommar, D. Norbäck and C. Janson

Basic Mechanisms in Allergic Disease

Mechanisms underlying induction of allergic sensitization by Pru p 3 (pages 1398–1408)

L. Tordesillas, N. Cubells-Baeza, C. Gómez-Casado, C. Berin, V. Esteban, W. Barcik, L. O'Mahony, C. Ramirez, L. F. Pacios, M. Garrido-Arandia and A. Díaz-Perales

Editor-in-Chief's Editorial: Epidemiology of Allergic Disease

Increased prevalence of allergic asthma from 1996 to 2006 and further to 2016—results from three population surveys (pages 1426–1435)

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Recent Database Articles

1. Spatiotemporal patterns of childhood asthma hospitalization and utilization in Memphis Metropolitan Area from 2005 to 2015.

Author(s): Oyana, Tonny J; Podila, Pradeep; Wesley, Jagila Minso; Lomnicki, Slawo; Cormier, Stephania

Source: The Journal of asthma : official journal of the Association for the Care of Asthma; Oct 2017; vol. 54 (no. 8); p. 842-855

Publication Date: Oct 2017

Publication Type(s): Journal Article

PubMedID: 28055280

Abstract:OBJECTIVETo identify the key risk factors and explain the spatiotemporal patterns of childhood asthma in the Memphis metropolitan area (MMA) over an 11-year period (2005-2015). We hypothesize that in the MMA region this burden is more prevalent among urban children living south, downtown, and north of Memphis than in other areas.METHODSWe used a large-scale longitudinal electronic health record database from an integrated healthcare system, Geographic information systems (GIS), and statistical and space-time models to study the spatiotemporal distributions of childhood asthma at census tract level.RESULTSWe found statistically significant spatiotemporal clusters of childhood asthma in the south, west, and north of Memphis city after adjusting for key covariates. The results further show a significant increase in temporal gradient in frequency of emergency department (ED) visits and inpatient hospitalizations from 2009 to 2013, and an upward trajectory from 4 per 1,000 children in 2005 to 16 per 1,000 children in 2015. The multivariate logistic regression identified age, race, insurance, admit source, encounter type, and frequency of visits as significant risk factors for childhood asthma ($p < 0.05$). We observed a greater asthma burden and healthcare utilization for African American (AA) patients living in a high-risk area than those living in a low-risk area in comparison to the white patients: AA vs. white [odds ratio (OR) = 3.03, 95% confidence interval (CI): 2.75-3.34]; and Hispanic vs. white (OR = 1.62, 95% CI: 1.21-2.17).CONCLUSIONSThese findings provide a strong basis for developing geographically tailored population health strategies at the neighborhood level for young children with chronic respiratory conditions.

2. DNA methylation levels associated with race and childhood asthma severity.

Author(s): Chan, Marcia A; Ciaccio, Christina E; Gigliotti, Nicole M; Rezaiekhaligh, Mo; Siedlik, Jacob A; Kennedy, Kevin; Barnes, Charles S

Source: The Journal of asthma : official journal of the Association for the Care of Asthma; Oct 2017; vol. 54 (no. 8); p. 825-832

Publication Date: Oct 2017

Publication Type(s): Journal Article

PubMedID: 27929694

Abstract:OBJECTIVEAsthma is a common chronic childhood disease worldwide. Socioeconomic status, genetic predisposition and environmental factors contribute to its incidence and severity. A disproportionate number of children with asthma are economically disadvantaged and live in substandard housing with potential indoor environmental exposures such as cockroaches, dust mites, rodents and molds. These exposures may manifest through epigenetic mechanisms that can lead to changes in relevant gene expression. We examined the association of global DNA

methylation levels with socioeconomic status, asthma severity and race/ethnicity.METHODSWe measured global DNA methylation in peripheral blood of children with asthma enrolled in the Kansas City Safe and Healthy Homes Program. Inclusion criteria included residing in the same home for a minimum of 4 days per week and total family income of less than 80% of the Kansas City median family income. DNA methylation levels were quantified by an immunoassay that assessed the percentage of 5-methylcytosine.RESULTSOur results indicate that overall, African American children had higher levels of global DNA methylation than children of other races/ethnicities ($p = 0.029$). This difference was more pronounced when socioeconomic status and asthma severity were coupled with race/ethnicity ($p = 0.042$) where low-income, African American children with persistent asthma had significantly elevated methylation levels relative to other races/ethnicities in the same context ($p = 0.006$, Hedges $g = 1.14$).CONCLUSIONOur study demonstrates a significant interaction effect among global DNA methylation levels, asthma severity, race/ethnicity, and socioeconomic status.

3. Can we predict fall asthma exacerbations? Validation of the seasonal asthma exacerbation index.

Author(s): Hoch, Heather E; Calatroni, Agustin; West, Joseph B; Liu, Andrew H; Gergen, Peter J; Gruchalla, Rebecca S; Khurana Hershey, Gurjit K; Kercsmar, Carolyn M; Kim, Haejin; Lamm, Carin I; Makhija, Melanie M; Mitchell, Herman E; Teach, Stephen J; Wildfire, Jeremy J; Busse, William W; Szefler, Stanley J

Source: The Journal of allergy and clinical immunology; Oct 2017; vol. 140 (no. 4); p. 1130

Publication Date: Oct 2017

Publication Type(s): Multicenter Study Journal Article Validation Studies

PubMedID: 28238748

Abstract:BACKGROUNDA Seasonal Asthma Exacerbation Predictive Index (saEPI) was previously reported based on 2 prior National Institute of Allergy and Infectious Diseases Inner City Asthma Consortium trials.OBJECTIVEThis study sought to validate the saEPI in a separate trial designed to prevent fall exacerbations with omalizumab therapy.METHODSThe saEPI and its components were analyzed to characterize those who had an asthma exacerbation during the Preventative Omalizumab or Step-Up Therapy for Fall Exacerbations (PROSE) study. We characterized those inner-city children with and without asthma exacerbations in the fall period treated with guidelines-based therapy (GBT) in the absence and presence of omalizumab.RESULTSA higher saEPI was associated with an exacerbation in both the GBT alone ($P < .001$; area under the curve, 0.76) and the GBT + omalizumab group ($P < .01$; area under the curve, 0.65). In the GBT group, younger age at recruitment, higher total IgE, higher blood eosinophil percentage and number, and higher treatment step were associated with those who had an exacerbation compared with those who did not. In the GBT + omalizumab group, younger age at recruitment, increased eosinophil number, recent exacerbation, and higher treatment step were also associated with those who had an exacerbation. The saEPI was associated with a high negative predictive value in both groups.CONCLUSIONSAn exacerbation in children treated with GBT with or without omalizumab was associated with a higher saEPI along with higher markers of allergic inflammation, treatment step, and a recent exacerbation. Those that exacerbated on omalizumab had similar features with the exception of some markers of allergic sensitization, indicating a need to develop better markers to predict poor response to omalizumab therapy and alternative treatment strategies for children with these risk factors. The saEPI was able to reliably predict those children unlikely to have an asthma exacerbation in both groups.

4. Allergic sensitization and objective measures of sleep in urban school-aged children with asthma.

Author(s): Esteban, Cynthia A.; Everhart, Robin S.; Kopel, Sheryl J.; Klein, Robert B.; Koinis-Mitchell, Daphne

Source: Annals of Allergy, Asthma & Immunology; Sep 2017; vol. 119 (no. 3); p. 238-245

Publication Date: Sep 2017

Publication Type(s): Academic Journal

PubMedID: 28890019

Abstract: Background: Allergic sensitization is associated with increased child asthma morbidity and decreased pulmonary function. Nocturnal symptoms and/or awakenings typically are measured by self-report from diary data, whereas objective assessments of sleep in child asthma studies are lacking.Objective: To investigate the association between increased allergic sensitization (number of positive allergy test results measured by skin prick test or specific immunoglobulin E) and sleep outcomes (sleep efficiency, sleep duration, and mean number of awakenings measured by actigraphy) in urban schoolchildren with persistent asthma.Methods: One hundred ninety-six children with persistent asthma (7-9 years old) attending public school in 1 of 4 large urban school districts completed allergy testing during a study clinic visit. Forced expiratory volume in 1 second was monitored at home using a handheld spirometer. Sleep outcomes were measured with a wrist Actiwatch during a 1-month period in the fall and winter seasons.Results: Number of positive allergy test results significantly predicted mean sleep efficiency (P = .02), such that children with more positive test results experienced less efficient sleep. Number of positive allergy test results significantly predicted mean number of night awakenings (P = .05), such that children with more positive allergy test results experienced more night awakenings. Variability in forced expiratory volume in 1 second was a significant moderator in the association between number of positive allergy test results and variability in sleep efficiency (P = .04). Racial and ethnic differences in allergic sensitization and sleep outcomes were found between African Americans and Latinos.Conclusion: More positive allergy test results were associated with poorer sleep outcomes measured objectively in this sample of urban children. Implications for environmental control interventions and asthma treatments in different racial and ethnic groups are discussed.

5. Predictors of polycyclic aromatic hydrocarbon exposure and internal dose in inner city Baltimore children

Author(s): Peters K.O.; Williams A.L.; Abubaker S.; McCormack M.C.; Breysse P.N.; Matsui E.C.; Hansel N.N.; Diette G.B.; Strickland P.T.; Curtin-Brosnan J.; Peng R.

Source: Journal of exposure science & environmental epidemiology; May 2017; vol. 27 (no. 3); p. 290-298

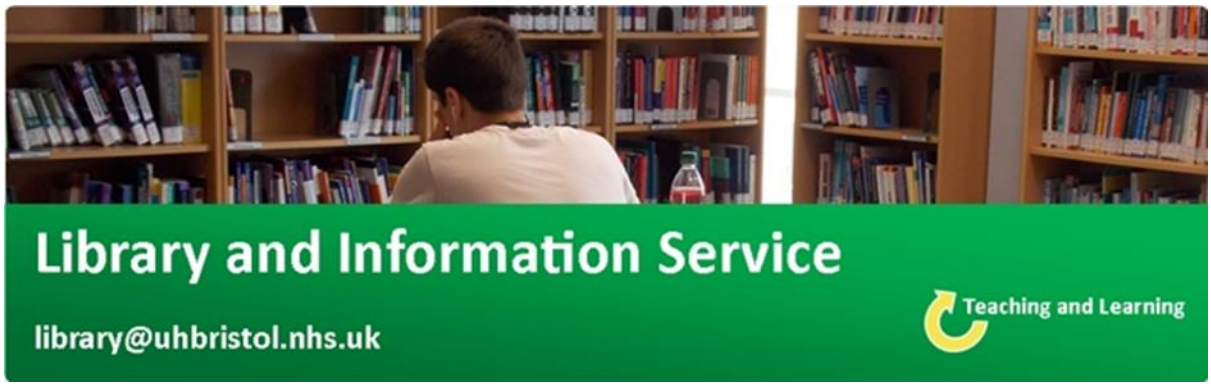
Publication Date: May 2017

Publication Type(s): Article

PubMedID: 27966668

Abstract: Polycyclic aromatic hydrocarbons (PAHs), the by-products of incomplete combustion of organic materials, are commonly found on particulate matter (PM) and have been associated with the development of asthma and asthma exacerbation in urban populations. We examined time spent in the home and outdoors as predictors of exposures to airborne PAHs and measured urinary 1-hydroxypyrene-glucuronide (1-OHPG) as internal dose of PAHs in 118 children aged 5-12 years from Baltimore, MD. During weeklong periods (Saturday-Saturday) in each of four seasons: daily activities were assessed using questionnaires, indoor air nicotine and PM concentrations were monitored, and urine specimens were collected on Tuesday (day 3) and Saturday (day 7) for

measurement of 1-OHPG. Time spent in non-smoking homes was associated with significantly decreased 1-OHPG concentration in urine (beta=-0.045, 95% CI (-0.076, -0.013)), and secondhand smoke (SHS) exposures modified these associations, with higher urinary 1-OHPG concentrations in children spending time in smoking homes than non-smoking homes (P-value for interaction=0.012). Time spent outdoors was associated with increased urinary 1-OHPG concentrations (beta=0.097, 95% CI (0.037, 0.157)) in boys only. Our results suggest that SHS and ambient (outdoor) air pollution contribute to internal dose of PAHs in inner city children.



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