Asthma News This Week

Childhood Asthma Leadership Coalition

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JOURNAL ARTICLES

IN THE NEWS

JOURNAL articles

Wang L., Timmer S., and K. Rosenman. Assessment of a University-based Outpatient Asthma Education Program for Children. *Journal of Pediatric Health Care.* Oct 2019: pii: S0891-5245(19)30358-X. doi: 10.1016/j.pedhc.2019.09.004.

INTRODUCTION: To assess the effect of a pediatric asthma intervention program on reducing asthma morbidity. METHODS: Study eligibility criteria included aged less than 18 years and at least two office visits for asthma in the previous year. Patients were randomly assigned to either the control or intent to intervene group. The intervention included home visits and education on the basic pathophysiology of asthma, self-management techniques, modification of asthma triggers, and proper use of asthma medications by a certified nurse educator. RESULTS: Using simple randomization, 901 eligible pediatric patients with asthma were assigned; 458 to the control and 443 to the intent to intervene group. Of the 443 patients randomized to the intent to intervene group, 271 received the asthma education intervention. Most of the remaining 172 patients in the intent to intervene group did not receive the intervention owing to not having an

appointment during the study period. Only 27 families allowed a home visit. After controlling for the difference in sex, children in the intent to intervene group had significantly less total clinic visits (incidence rate ratio [IRR] = 0.53, p < .01), and steroid bursts (IRR = 0.47, p < .01) than controls. DISCUSSION: The implementation of a pediatric asthma education program decreased both the total clinic visits and the need for steroid bursts consistent with better asthma control. We demonstrated the benefit of a dedicated asthma educator in university-based community practice and recommend this intervention be considered a standard of care for children with asthma in all health-care settings.

Thomas J.L., et al. Promoting Smoke-Free Homes Through Biomarker Feedback Documenting Child Exposure to Tobacco Toxins: Protocol for a Randomized Clinical Trial. *JMIR Research Protocol.* Oct 2019; 8(10): e12654. doi: 10.2196/12654.

BACKGROUND: Exposure to secondhand smoke (SHS) early in life increases the risk of sudden infant death syndrome (SIDS), asthma, and respiratory illnesses. Since children's primary exposure to SHS occurs in the home, these most vulnerable members of our society are not fully protected by recent increases in the adoption of smoking bans in public spaces. Although exposure to SHS is a quickly reversible cause of excess morbidity, few low-income homes strictly enforce smoking restrictions. OBJECTIVE: This study aims to test a novel approach to motivate the adoption of home smoking restrictions and to eliminate child SHS exposure by providing parents with objective data documenting home SHS exposure and "biomarker feedback" of child ingestion of tobacco toxins, that is, objective, laboratory-based results of assays performed on child urine, documenting levels of nicotine; cotinine; and NNAL (4-[methylnitrosamino]-1-[3-pyridyl]-1-butanol), which is a metabolite of the known tobacco carcinogen NNK (4-[methylnitro-samino]-1-[3-pyridyl]-1-butanone). METHODS: From 2011 to 2013, 195 low-income, female smokers with children aged ≤10 years residing in their homes were recruited into a two-arm randomized clinical trial. Participants were assigned to one of two groups: biomarker feedback (n=98) and health education (n=97). In-home assessments were administered at baseline, week 16, and week 26. Children's home SHS exposure and nicotine, cotinine, and NNAL levels from urine samples, measured through a passive nicotine dosimeter and a surface sample of residual tobacco smoke (ie, thirdhand smoke), were collected at all three time points. Primary outcome was dosimeter-verified, self-reported complete home smoking restrictions at 6 months after randomization. Secondary outcomes included parental self-report of smoking behavior change and child urine tobacco toxin (biomarker) change. RESULTS: Data collection and analyses are complete, and the results are being interpreted. CONCLUSIONS: The study protocol describes the development of a novel community-based controlled trial designed to examine the efficacy of biomarker feedback documenting home and child exposure to SHS on parental smoking behavior change. INTERNATIONAL REGISTERED REPORT IDENTIFIER (IRRID): RR1-10.2196/12654.

Arcoleo K., et al. Explanatory Model for Asthma Disparities in Latino Children: Results from the Latino Childhood Asthma Project. *Annals of Behavioral Medicine.* Oct 2019: pii: kaz041. doi: 10.1093/abm/kaz041.

BACKGROUND: Little research has been conducted that integrates, in one explanatory model, the multitude of factors potentially leading to disparities among Latino children. PURPOSE: A longitudinal, observational study tested an explanatory model for disparities in asthma control between Mexican and Puerto Rican children with persistent asthma requiring daily controller medication use. METHODS: Mexican and Puerto Rican children aged 5-12 years (n = 267) and their caregivers (n = 267) were enrolled and completed interviews and child spirometry at baseline and 3, 6, 9, and 12 months postenrollment. A 12 month retrospective children's medical record review was completed. Participants were recruited from two school-based health clinics and the Breathmobile in Phoenix, AZ, and two inner-city hospital asthma clinics in the Bronx, NY. RESULTS: Statistically significant differences in the social/contextual predictors of asthma illness representations (IRs) were noted between Mexican and Puerto Rican caregivers. The structural equation model results revealed differences in asthma control over time by ethnicity. This model accounted for 40%-48% of the variance in asthma control test scores over 12 months. Caregivers' IRs aligned with the professional model of asthma management were associated with better children's asthma control across 1 year. These results also supported the theoretical notion that IRs change over time impacting caregivers' treatment decisions and children's asthma control. CONCLUSIONS: These findings extend a previous cross-sectional model test using a more comprehensive model and longitudinal data and highlight the importance of considering within-group differences for diagnosis and treatment of children coming from the vastly heterogeneous Latino umbrella group.

Bardach, N.S., et al. Depression, Anxiety, and Emergency Department Use for Asthma. *Pediatrics.* Oct 2019; 144(4): pii: e20190856. doi: 10.1542/peds.2019-0856.

BACKGROUND AND OBJECTIVES: Asthma is responsible for ~1.7 million emergency department (ED) visits annually in the United States. Studies in adults have shown that anxiety and depression are associated with increased asthma-related ED use. Our objective was to assess this association in pediatric patients with asthma. METHODS: We identified patients aged 6 to 21 years with asthma in the Massachusetts All-Payer Claims Database for 2014 to 2015 using International Classification of Diseases, Ninth and 10th Revision codes. We examined the association between the presence of anxiety, depression, or comorbid anxiety and depression and the rate of asthma-related ED visits per 100 child-years using bivariate and multivariable analyses with negative binomial regression. RESULTS: Of 65 342 patients with asthma, 24.7% had a diagnosis of anxiety, depression, or both (11.2% anxiety only, 5.8% depression only, and 7.7% both). The overall rate of asthma-related ED use was 17.1 ED visits per 100 child-years (95% confidence interval [CI]: 16.7-17.5). Controlling for age, sex, insurance type, and other chronic illness, patients with anxiety had a rate of 18.9 (95% CI: 17.0-20.8) ED visits per 100 child-years, patients with depression had a rate of 21.7 (95% CI: 18.3-25.0), and patients with both depression and anxiety had a rate of 27.6 (95% CI: 24.8-30.3). These rates were higher than those of patients who had no diagnosis of anxiety or depression (15.5 visits per 100 child-years; 95% CI: 14.5-16.4; P < .001). CONCLUSIONS: Children with asthma and anxiety or depression alone, or comorbid anxiety and depression, have higher rates of asthma-related ED use compared with those without either diagnosis.

Peden, D.B. The “envirome” and what the practitioner needs to know about it. *Annals of Allergy and Asthma Immunology.* Sep 2019: pii: S1081-1206(19)31192-5. doi: 10.1016/j.anai.2019.09.014.

OBJECTIVE: This review on the "envirome" focuses on pollution, microbial, and social stressor elements of the environment that may impact development or expression of allergic diseases. DATA SOURCES: Peer-reviewed publications on the impact of environmental factors indexed in PubMed were the primary data source for this review. STUDY SELECTIONS: The primary search strategy for this review employed cross-referencing asthma, atopic dermatitis, and immunoglobulin E (IgE) against pollution (ozone, particulate matter, nitrogen oxides, tobacco smoke), microbial exposures (farm exposure, microbiome, infection, antibiotic use) and psychosocial stressors, with emphasis on results in the past 5 years, with inclusion of key seminal articles or comprehensive reviews. RESULTS: Air pollution is a clear cause of allergic disease exacerbation, with increasing recognition that pollutant exposure increases risk of allergic disease. Microbial exposures and maternal and child stress also modulate development and expression of allergic disease. Early life exposures are especially critical periods during which all of these factors have notable impacts on allergic disease. CONCLUSION: Nonallergenic environmental factors are important modulators and adjuvants for development of allergic disease, with early life exposures being especially important. Development and validation of interventions directed toward these factors during early life is a significant opportunity for primary prevention of allergic disease.

Gateau K.L., David H., and C.G. Lowe. Hopkins Syndrome: Post Flaccid Paralysis After an Asthma Exacerbation. *Pediatric Emergency Care.* Oct 2019; 35(10): e190-e191. doi: 10.1097/PEC.0000000000001921.

We report a rare case of a 22-month-old who developed flaccid paralysis of her right arm shortly after she was hospitalized for an asthma exacerbation. There are many etiologies of acute flaccid paralysis; however, because of the uncommon presentation of a focalized finding, establishing the diagnosis of this patient was difficult in the emergency department setting. Associated with asthma exacerbations, Hopkins syndrome is a paralytic illness that resembles poliomyelitis. This case highlights the challenges of evaluating a child with monoparesis and establishing an association with asthma amyotrophy.

Thomas M.M.C, Miller D.P, and T.W. Morrissey. Food Insecurity and Child Health. *Pediatrics.* Oct 2019; 144(4). pii: e20190397. doi: 10.1542/peds.2019-0397

OBJECTIVES: Food insecurity is an important public health problem facing children in the United States. Although a number of previous studies suggest that food insecurity has negative impacts on health, these studies have not dealt thoroughly with issues of selection bias. We use propensity scoring techniques to approximate the causal effects of food insecurity on children's health and health care use outcomes. METHODS: We use nationally representative data from the 2013-2016 waves of the National Health Interview Study (N = 29 341). Using inverse probability of treatment weighting, a propensity scoring method, we examine a broad range of child health outcomes and account for a comprehensive set of controls, focusing on a sample of children 2 to

17 years old. RESULTS: Household food insecurity was related to significantly worse general health, some acute and chronic health problems, and worse health care access, including forgone care and heightened emergency department use, for children. Compared to rates had they not been food insecure, children in food-insecure household had rates of lifetime asthma diagnosis and depressive symptoms that were 19.1% and 27.9% higher, rates of foregone medical care that were 179.8% higher, and rates of emergency department use that were 25.9% higher. No significant differences emerged for most communicable diseases, such as ear infections or chicken pox, or conditions that may develop more gradually, including anemia and diabetes. CONCLUSIONS: Policies used to reduce household food insecurity among children may also reduce children's chronic and acute health problems and health care needs.

Wechsler M.E., et al. Step-Up Therapy in Black Children and Adults with Poorly Controlled Asthma. *New England Journal of Medicine.* Sept 2019; 381(13): 1227-1239. doi: 10.1056/NEJMoa1905560.

BACKGROUND: Morbidity from asthma is disproportionately higher among black patients than among white patients, and black patients constitute the minority of participants in trials informing treatment. Data indicate that patients with inadequately controlled asthma benefit more from addition of a long-acting beta-agonist (LABA) than from increased glucocorticoids; however, these data may not be informative for treatment in black patients. METHODS: We conducted two prospective, randomized, double-blind trials: one involving children and the other involving adolescents and adults. In both trials, the patients had at least one grandparent who identified as black and had asthma that was inadequately controlled with low-dose inhaled glucocorticoids. We compared combinations of therapy, which included the addition of a LABA (salmeterol) to an inhaled glucocorticoid (fluticasone propionate), a step-up to double to quintuple the dose of fluticasone, or both. The treatments were compared with the use of a composite measure that evaluated asthma exacerbations, asthma-control days, and lung function; data were stratified according to genotypic African ancestry. RESULTS: When quintupling the dose of fluticasone (to 250 μg twice a day) was compared with adding salmeterol (50 μg twice a day) and doubling the fluticasone (to 100 μg twice a day), a superior response occurred in 46% of the children with quintupling the fluticasone and in 46% of the children with doubling the fluticasone and adding salmeterol (P = 0.99). In contrast, more adolescents and adults had a superior response to added salmeterol than to an increase in fluticasone (salmeterol-low-dose fluticasone vs. medium-dose fluticasone, 49% vs. 28% [P = 0.003]; salmeterol-medium-dose fluticasone vs. high-dose fluticasone, 49% vs. 31% [P = 0.02]). Neither the degree of African ancestry nor baseline biomarkers predicted a superior response to specific treatments. The increased dose of inhaled glucocorticoids was associated with a decrease in the ratio of urinary cortisol to creatinine in children younger than 8 years of age. CONCLUSIONS: In contrast to black adolescents and adults, almost half the black children with poorly controlled asthma had a superior response to an increase in the dose of an inhaled glucocorticoid and almost half had a superior response to the addition of a LABA. (Funded by the National Heart, Lung, and Blood Institute; BARD ClinicalTrials.gov number, NCT01967173.).

Teach, S.J., et al. Randomized clinical trial of parental psychosocial stress management to improve asthma outcomes. *Journal of Asthma.* Sept 2019: 1-12. doi: 10.1080/02770903.2019.1665063.

Objective: Because higher parental psychosocial stress is associated with worsened asthma outcomes in children, we sought to determine if a parent-focused stress management intervention would improve outcomes among their at-risk African American children. Methods: We enrolled self-identified African American parent-child dyads (children aged 4-12 years old with persistent asthma, no co-morbidities, on Medicaid) in a prospective, single-blind, randomized clinical trial with follow-up at 3, 6, and 12 months. All children received care based on the guidelines of the National Institutes of Health. Developed with extensive local stakeholder engagement, the intervention consisted of four individual sessions with a community wellness coach (delivered over 3 months) supplemented with weekly text messaging and twice monthly group sessions (both delivered for 6 months). The main outcome was asthma symptom-free days in the prior 14 days by repeated measures at 3 and 6 months follow-up. Results: We randomized 217 parent-child dyads and followed 196 (90.3%) for 12 months. Coaches completed 338/428 (79%) of all individual sessions. Symptom-free days increased significantly from baseline in both groups at 3, 6, and 12 months, but there were no significant differences between groups over the first 6 months. At 12 months, the intervention group sustained a significantly greater increase in symptom-free days from baseline [adjusted difference = 0.92 days, 95% confidence interval (0.04, 1.8)]. Conclusion: The intervention did not achieve its primary outcome. The efficacy of providing psychosocial stress management training to parents of at-risk African American children with persistent asthma in order to improve the children's outcomes may be limited. ClinicalTrials.gov: NCT02374138 Abbreviations NIH National Institutes of Health AA African American ED emergency department SFD symptom free days RA research assistant GEE generalized estimating equations SD standard deviation CI confidence interval.

In the NEWS

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