

This is the preprint version of the contribution published as:

Contreras, Z., Chen, Z., Roumeliotaki, T., Annesi-Maesano, I., Baiz, N., von Berg, A., Bergstrom, A., Bindeslev-Jensen, C., Crozier, S., Duijts, L., Ekstrom, S., Eller, E., Fantini, M., Forastiere, F., Gerhard, B., Gori, D., Harskamp-van Ginkel, M., Heinrich, J., Iñiguez, C., Inskip, H., Keil, T., Kogevinas, M., Lau, S., **Lehmann, I.**, Maier, D., van Meel, E., Mommers, M., Murcia, M., Porta, D., Smit, H., Standl, M., Stratakis, N., Sunyer, J., Thijs, C., Torrent, M., Vrijkotte, T., Wijga, A., Berhane, K., Gilliland, F., Chatzi, L. (2018):

[Early childhood asthma and the risk of new onset obesity: An individual participant meta-analysis of 16 European birth cohorts](#)

Am. J. Respir. Crit. Care Med. **197** , A4469

Early Childhood Asthma and the Risk of New Onset Obesity: An Individual Participant Meta-Analysis of 16 European Birth Cohorts

Z. Contreras¹, Z. Chen¹, T. Roumeliotaki², I. Annesi-Maesano³, N. Baiz³, A. Von Berg⁴, A. Bergstrom⁵, C. Bindsvlev-Jensen⁶, S. Crozier⁷, L. Duijts⁸, S. Ekstrom⁵, E. Eller⁶, M. Fantini⁹, F. Forastiere¹⁰, B. Gerhard¹¹, D. Gori⁹, M. Harskamp-van Ginkel¹², J. Heinrich¹³, C. Iñiguez¹⁴, H. Inskip⁷, T. Keil¹⁵, M. Kogevinas¹⁶, S. Lau¹⁵, I. Lehmann¹⁷, D. Maier¹¹, E. van Meel⁸, M. Mommers¹⁸, M. Murcia¹⁹, D. Porta¹⁰, H. Smit²⁰, M. Standl¹³, N. Stratakis²¹, J. Sunyer¹⁶, C. Thijs¹⁸, M. Torrent²², T. Vrijkotte¹², A. Wijga²³, K. Berhane¹, F. Gilliland¹, L. Chatzi¹; ¹Preventive Medicine, University of Southern California, Los Angeles, CA, United States, ²Social Medicine, University of Crete, Heraklion, Greece, ³Epidemiology of Allergic and Respiratory Diseases, INSERM, Paris, France, ⁴Pediatrics, Marien Hosp Wesel, Wesel D 46483, Germany, ⁵Institute of Environmental Medicine, Karolinska Institute, Stockholm, Sweden, ⁶Department of Dermatology and Allergy Center, Odense Research Centre for Anaphylaxis (ORCA), Odense, Denmark, ⁷MRC Lifecourse Epidemiology Unit, University of Southampton, Southampton General Hospital, Southampton, United Kingdom, ⁸Pediatrics, Erasmus MC, University Medical Center, Rotterdam, Netherlands, ⁹Biomedical and Neuromotor Sciences, University of Bologna, Bologna, Italy, ¹⁰Epidemiology, Lazio Regional Health Service, Rome, Italy, ¹¹Biomax Informatics AG, Martinsried, Germany, ¹²Public Health, Amsterdam Public Health Research Institute, Academic Medical Center, University of Amsterdam, Amsterdam, Netherlands, ¹³Institute of Epidemiology I, Helmholtz Zentrum München - German Research Center for Environmental Health, Neuherberg, Germany, ¹⁴Statistics and Operational Research, University of Valencia, Valencia, Spain, ¹⁵Pediatrics, Charité, Berlin, Germany, ¹⁶ISGlobal, Centre for Research in Environmental Epidemiology (CREAL), Barcelona, Spain, ¹⁷Environmental Immunology/Core Facility Studies, Helmholtz Centre for Environmental Research-UFZ, Leipzig, Germany, ¹⁸Epidemiology, CAPHRI Care and Public Health Research Institute, Maastricht University Medical Centre+, Maastricht, Netherlands, ¹⁹CIBER Epidemiología y Salud Pública (CIBERESP), Barcelona, Spain, ²⁰Julius Center for Health Sciences and Primary Care, University Medical Center Utrecht, Utrecht, Netherlands, ²¹NUTRIM School of Nutrition and Translational Research in Metabolism, Maastricht University, Maastricht, Netherlands, ²²Ib-salut, Area de Salut de Menorca, Menorca, Spain, ²³Centre for Nutrition, Prevention and Health Services, National Institute of Public Health and the Environment, Biltho

Background: The prevalence of both asthma and obesity has increased considerably over the past few decades, spurring research into possible links between these conditions. Most research to date has focused on obesity as a risk factor for asthma, but little is known regarding the potential role of asthma in obesity incidence. **Methods:** We pooled individual data from 16 European birth cohorts, which collected information on asthma phenotypes using validated

questionnaires. Children's height and weight were obtained from physical exams and health records. Obesity was defined according to the International Obesity Task Force Criteria (IOTF). We followed 21,643 non-obese children at 3-4 years of age and examined obesity incidence up to 8 years of age. We used Cox proportional hazards models with a random effect for cohort to estimate pooled hazard ratios for the association between having doctor-diagnosed asthma and wheezing symptoms at 3-4 years of age or younger, and obesity onset by end of follow-up. Confounder selection was based on directed acyclic graphs. To assess the consistency of our results, we also calculated cohort-specific effects and combined them using random effects meta-analysis. Results: The prevalence of doctor-diagnosed asthma and wheezing in the last 12 months at 3-4 years of age was 5.7% and 12.5%, respectively. Children with doctor-diagnosed asthma at 3-4 years of age had a 62% higher risk for incident obesity than those without asthma (adjusted HR (aHR): 1.62, 95% CI: 1.17, 2.24). Children with active asthma at 3-4 years of age (wheeze in the last 12 months and doctor-diagnosed asthma), exhibited an even greater risk for developing obesity (aHR: 1.92, 95% CI: 1.28, 2.91) than those without active asthma. When assessing wheezing patterns, risk was most pronounced for children who had persistent wheezing (aHR: 1.50, 95% CI: 1.08, 2.09) compared to those with transient or late onset wheezing. Our meta-analysis results were similar to our pooled estimates with no significant heterogeneity between cohorts. When further excluding overweight children at baseline, we found comparable, but attenuated results. Stratification by sex and parental asthma history did not reveal any differences by subgroup. Conclusion: Early childhood asthma and wheezing may contribute to an increased risk of developing obesity in later childhood. Further investigation of the early biological and lifestyle factors that may underlie the greater risk of obesity in asthmatic children is warranted.

This abstract is funded by: This work was partially supported by MeDALL (Mechanisms of the Development of ALLergy), and CHICOS (Developing a Child Cohort Research Strategy for Europe) collaborative projects conducted within the European Commission FP7 Programmes (Health &F2-grant agreements No. 261357 and 241604). This work was also supported by the Southern California Environmental Health Sciences Center (grant # P30ES007048) funded by the National Institute of Environmental Health Sciences [PI Gilliland].