Early-life antibiotic use and risk of asthma and eczema: results of a discordant twin study

Elise M.A. Slob, Bronwyn K. Brew, Susanne J.H. Vijverberg, Chantal J.A.R. Kats, Cristina Longo, Mariëlle W. Pijnenburg, Toos C.E.M. van Beijsterveldt, Conor V. Dolan, Meike Bartels, Patrick Magnusson, Paul Lichtenstein, Tong Gong, Gerard H. Koppelman, Catarina Almqvist, Dorret I. Boomsma and Anke H. Maitland-van der Zee

Affiliations: 1Dept of Respiratory Medicine, Amsterdam University Medical Center, University of Amsterdam, Amsterdam, The Netherlands. 2Dept of Paediatric Pulmonology, Amsterdam University Medical Center, University of Amsterdam, Amsterdam, The Netherlands. 3Dept of Medical Epidemiology and Biostatistics, Karolinska Institutet, Stockholm, Sweden. 4National Perinatal Epidemiology and Biostatistics Unit, Centre for Big Data Research in Health and Dept of Women’s and Children’s Health, University of New South Wales, Sydney, Australia. 5Dept of Paediatrics, Division of Respiratory Medicine and Allergology, ErasmusMC, University Medical Center Rotterdam, Rotterdam, The Netherlands. 6Netherlands Twin Register, Dept of Biological Psychology, Vrije Universiteit Amsterdam, Amsterdam, The Netherlands. 7Dept of Paediatric Pulmonology and Paediatric Allergology, Beatrix Children’s Hospital, University of Groningen, University Medical Center Groningen, Groningen, The Netherlands. 8Groningen Research Institute for Asthma and COPD (GRIAC), University of Groningen, University Medical Center Groningen, Groningen, The Netherlands. 9Paediatric Allergy and Pulmonology Unit, Astrid Lindgren Children’s Hospital, Karolinska University Hospital, Stockholm, Sweden.

Correspondence: Anke H. Maitland-van der Zee, Dept of Respiratory Medicine, Amsterdam University Medical Center, Meibergdreef 9, 1100 DE Amsterdam, The Netherlands. E-mail: a.h.maitland@amsterdamumc.nl

Large twin studies show that antibiotics in early life are associated with risk of asthma, regardless of familial environment and genetics, and possibly due to early infections. Risks and benefits of antibiotics use in infants should be considered.


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ABSTRACT

Rationale: Early-life antibiotic use has been associated with the development of atopic diseases, but the aetiology remains unclear. To elucidate the aetiology, we used a discordant twin design to control for genetic and environmental confounding.

Methods: We conducted a retrospective cohort study in twins aged 3–10 years from the Netherlands Twin Register (NTR, n=35365) and a replication study in twins aged 9 years from the Childhood and Adolescent Twin Study in Sweden (CATSS, n=7916). Antibiotic use was recorded at age 0–2 years. Doctor-diagnosed asthma and eczema were reported by parents when children were aged 3–12 years in both cohorts. Individuals were included in unmatched analyses and in co-twin control analyses with disease discordant twin pairs.

Results: Early-life antibiotic use was associated with increased risk of asthma (NTR OR 1.34, 95% CI 1.28–1.41; CATSS OR 1.45, 95% CI 1.34–1.56) and eczema (NTR OR 1.08, 95% CI 1.03–1.13; CATSS OR 1.07, 95% CI 1.01–1.14) in unmatched analyses. Co-twin analyses in monozygotic and dizygotic twin pairs...
showed similar results for asthma (NTR OR 1.54, 95% CI 1.20–1.98; CATSS OR 2.00, 95% CI 1.28–3.13), but opposing results for eczema in the NTR (OR 0.99, 95% CI 0.80–1.25) and the CATSS (OR 1.67, 95% CI 1.12–2.49). The risk of asthma increased for antibiotics prescribed for respiratory infections (CATSS OR 1.45, 95% CI 1.34–1.56), but not for antibiotics commonly used for urinary tract/skin infections (CATSS OR 1.02, 95% CI 0.88–1.17).

**Conclusion:** Children exposed to early-life antibiotic use, particularly prescribed for respiratory infections, may be at higher risk of asthma. This risk can still be observed when correcting for genetic and environmental factors. Our results could not elucidate whether the relationship between early-life antibiotic use and eczema is confounded by familial and genetic factors.