

Summary

Introduction: Antibiotics are the most commonly prescribed drugs for children, but studies investigating their effects on early life growth, in particular weight and length, have been largely inconsistent. Using a Dutch infant cohort study, we investigate the effects of antibiotic exposure (including type of antibiotics) within the first week of life on growth in the first year. To compare our results with the literature, we also looked at the effects of antibiotic exposure within the first six months of life on subsequent growth till one year of age.

Statistical Methods: A linear mixed effects model with second order polynomials instead of traditional linear regression has been used to account for the correlation between repeated measurements and to account for the variation in baseline measurements and growth rate of each subject.

Data and Measurement: The data of 436 infants were obtained from four teaching hospitals in the Netherlands: the Meander Medical Center in Amersfoort; the Gelre Hospitals in Apeldoorn; the Tergooi Hospital in Blaricum; and the St. Antonius Hospital in Nieuwegein. The data was obtained as part of the INCA study (INtestinal microbiota Composition after Antibiotic treatment in early life), which investigated the effects of early life antibiotic exposure on the microbiota of the infants. The data included demographic variables such as sex and mode of delivery, and monthly growth measurements, for a total of 12 time point measurements, each approximately 1 month apart. The outcomes of interest were weight and length, weight-for-age z scores, length-

for-age z scores and weight-for-length z scores. The z scores were converted from the weight and length measurements based on the fourth Dutch growth study using the "AGD" package in the R library on boys and girls separately.

Results: Antibiotic exposure in the first week of life was associated with slower growth rates in most measurements. Exposure to augmentin, and amoxicillin showed a greater change in length and length-for-age z scores growth rates than penicillin. Antibiotic exposure in the first six months of life was not associated with changes in growth rates of any growth outcomes in the second six months of the first year.

Conclusion: Antibiotic exposure in the first week of life was associated with slower growth rate of most first year measurements. A longer follow up period and collection of additional body composition measurements is needed to further investigate if antibiotic exposure in the first week is associated with differences in growth that persist past infancy. More complex statistical models should also be carried out to account for the baseline characteristics difference between the exposed and unexposed group to further investigate the effects of antibiotics on growth measurements.