

Antibiotics and childhood weight: are they linked?

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on behalf of Healthy Weight and Big Data Teams
of A Better Start

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Disclaimer Statement

Access to the data presented was managed by Statistics New Zealand under strict micro-data access protocols and in accordance with the security and confidentiality provisions of the Statistic Act 1975. Our findings are not Official Statistics. The opinions, findings, recommendations, and conclusions expressed are those of the researchers, not Statistics NZ

Introduction

Antibiotics were used as growth-promoting agents especially weight in farm animals since the 1950s.

In mice, antibiotics have been shown to be a causative factor for obesity.

Notably, antibiotic exposure at a critical period around birth had a significant effect on increasing fat mass in mice.

Dibner JJ et al. Poult Sci. 2005;84(4):634-43.

Cox Laura M et al. Cell. 2014;158(4):705-21.

Cho I et al. Nature. 2012;488(7413):621-6.

Data in humans have been conflicting.

Some studies showed no association between antibiotics on weight gain.

But many studies showed increased antibiotic usage is associated with greater obesity risk.

The effects of antibiotics were more apparent in children:

- treated within the first 6 months of life
- treated with 3+ courses of antibiotics
- treated with broad-spectrum antibiotics
- males

Hypothesis

Antibiotics exposure during pregnancy and in early childhood (< 2 years) would be associated with an increased risk of obesity in childhood (4 to 5 years of age).

Specific aims

1. Association with amount and type of antibiotics
2. Confounding effects of ethnicity, socioeconomic status and gestational age
3. Interaction between antibiotics usage by the mothers during pregnancy and by the child during infancy.

Methodology

Access to 2 databases (Before School Check and Antibiotics Prescriptions) of almost 150,000 women and children collected over a 8-year period.

The project is a collaboration with the Big Data Team of A Better Start National Science Challenge.

Methodology

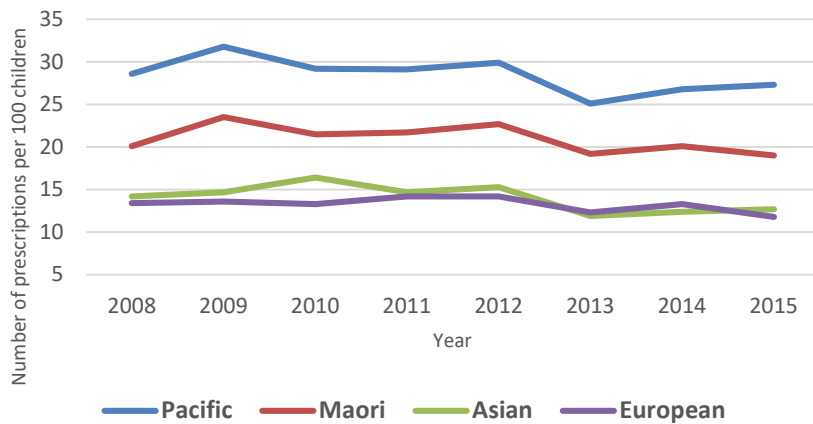
Data on height and weight of nearly all 4-year-olds in New Zealand.

Data from prescription records (2008 to 2015) on the usage of antibiotics among pregnant women and children from birth till 2 years of age.

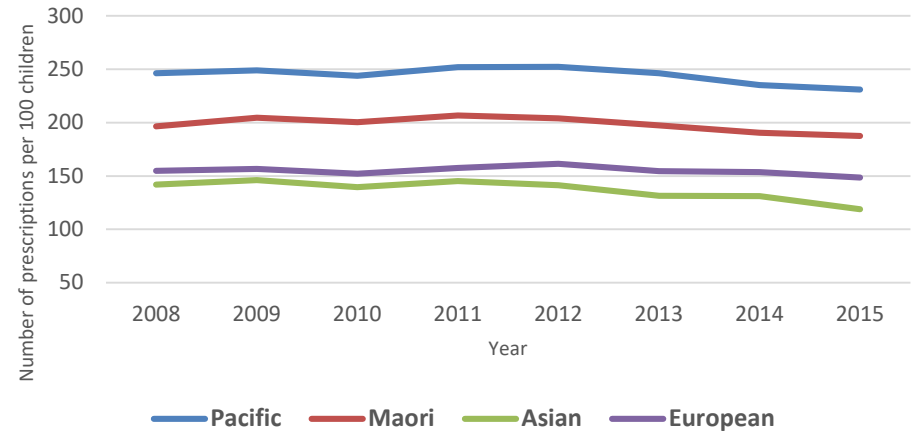
Data include amount and type of antibiotics used.

Demographic results

Antibiotic prescriptions for children from birth to 6 months by ethnicity

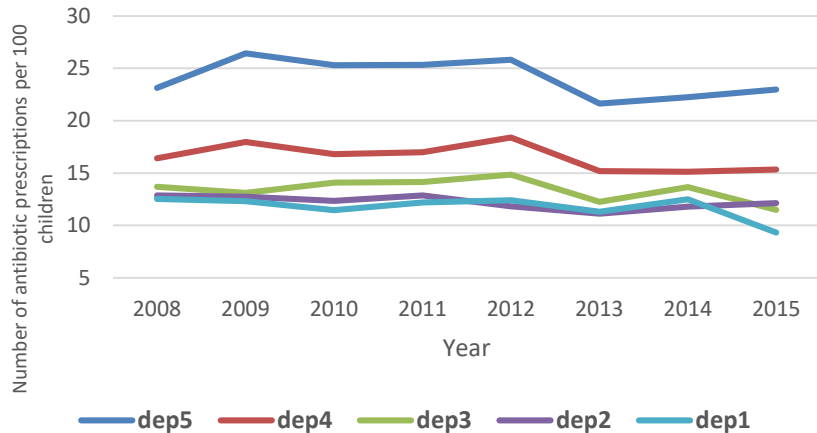


Antibiotic prescriptions for children from 6-24 months by ethnicity

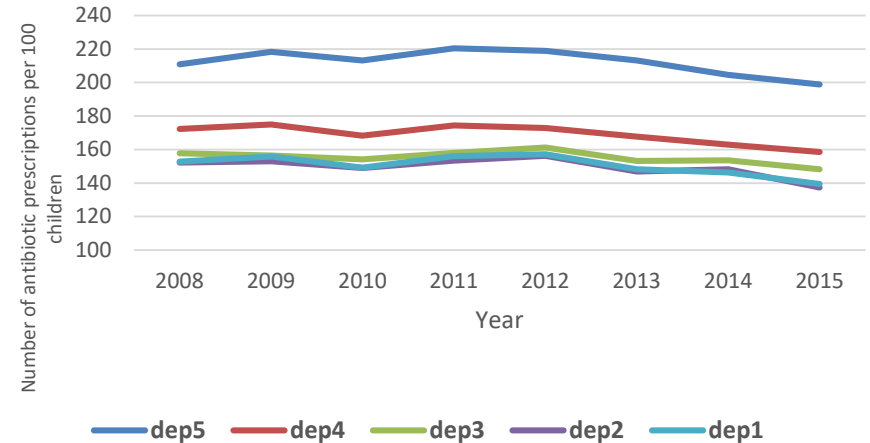


Demographic results

Antibiotic prescription rates for children from birth till 6 months by NZ Deprivation Quintile

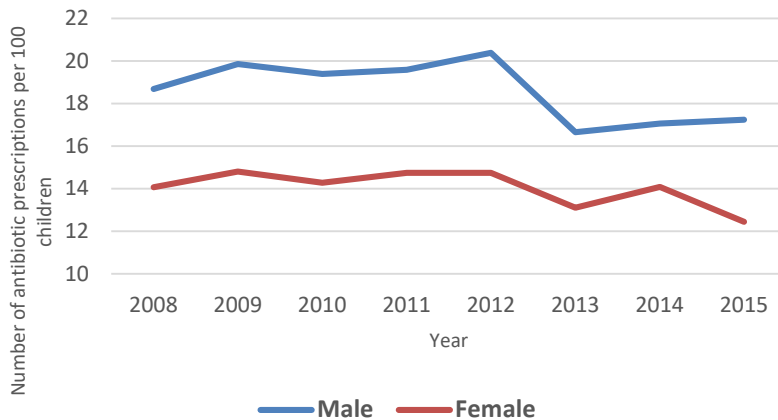


Antibiotic prescription rates for children from 6-24 months by NZ Deprivation Quintile

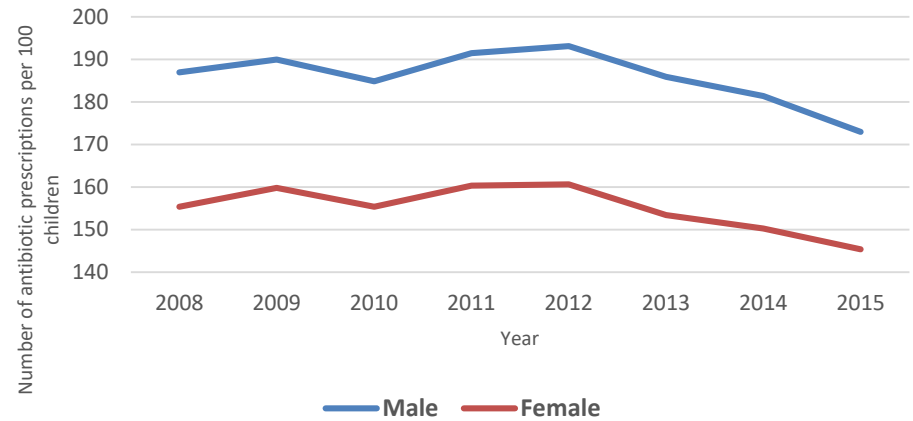


Demographic results

Antibiotic prescription rates for children from birth to 6 months by sex

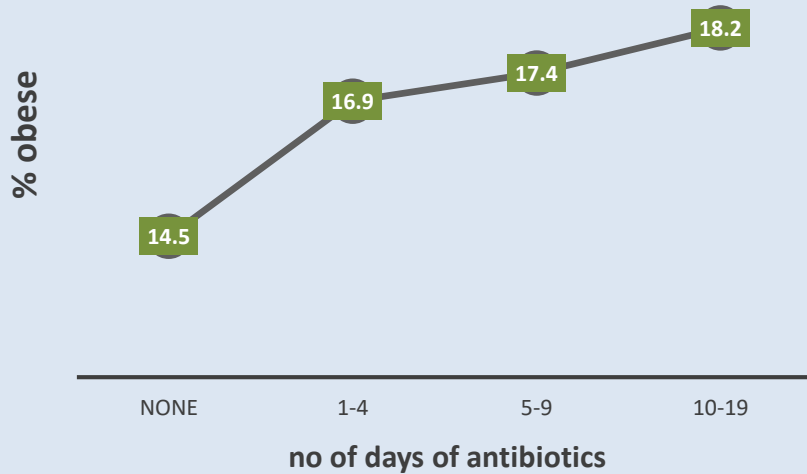


Antibiotic prescription rates for children from 6-24 months by sex

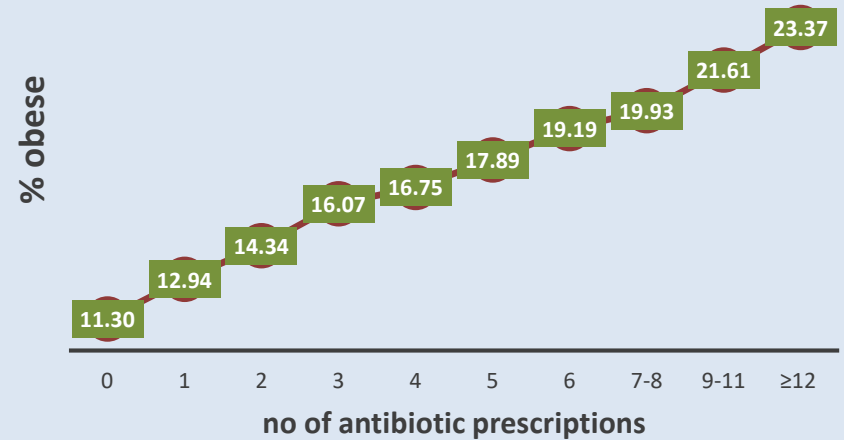


Results

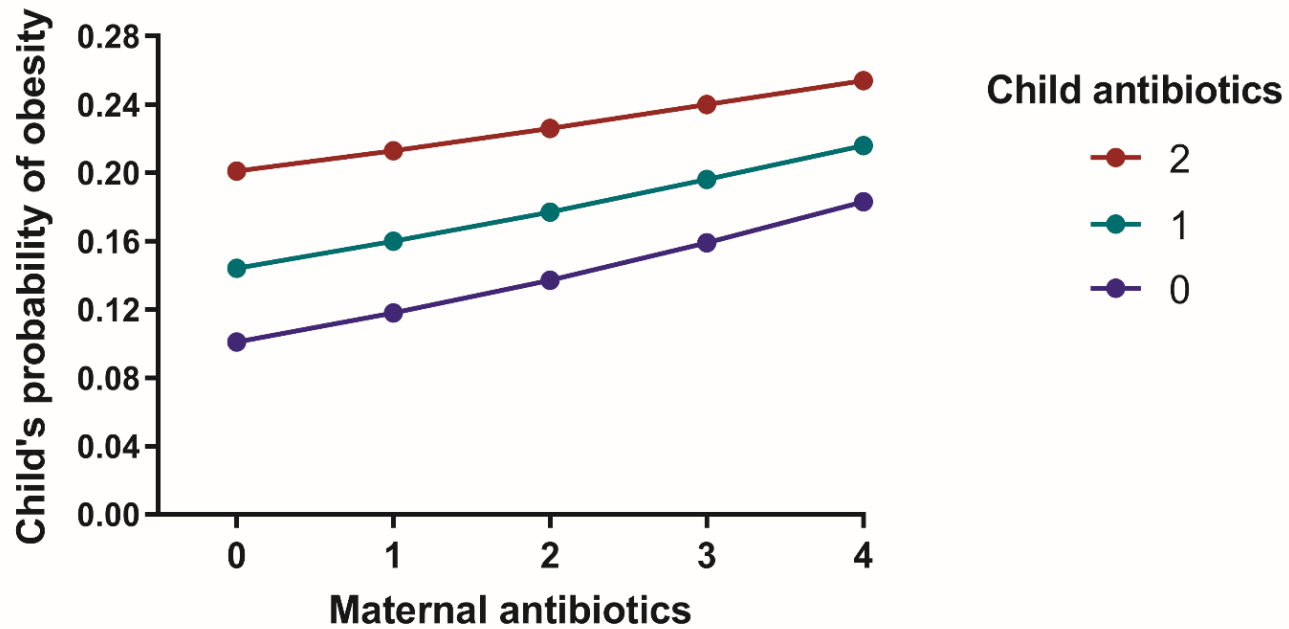
% obese children whose mothers had antibiotics during pregnancy



% obese children who were exposed to antibiotics from birth till 2 years of age



Results



Summary

There are strong independent associations between both maternal and infant antibiotic use and obesity at age 4-5 years.

There is a compounding effect of mother's and child's antibiotic use on the risk of obesity in childhood.

There is high usage of antibiotics among Pasifika and Maori.