A Study on the Association between Breastfeeding and Allergies in Children 5 Years Old or Younger in the United States

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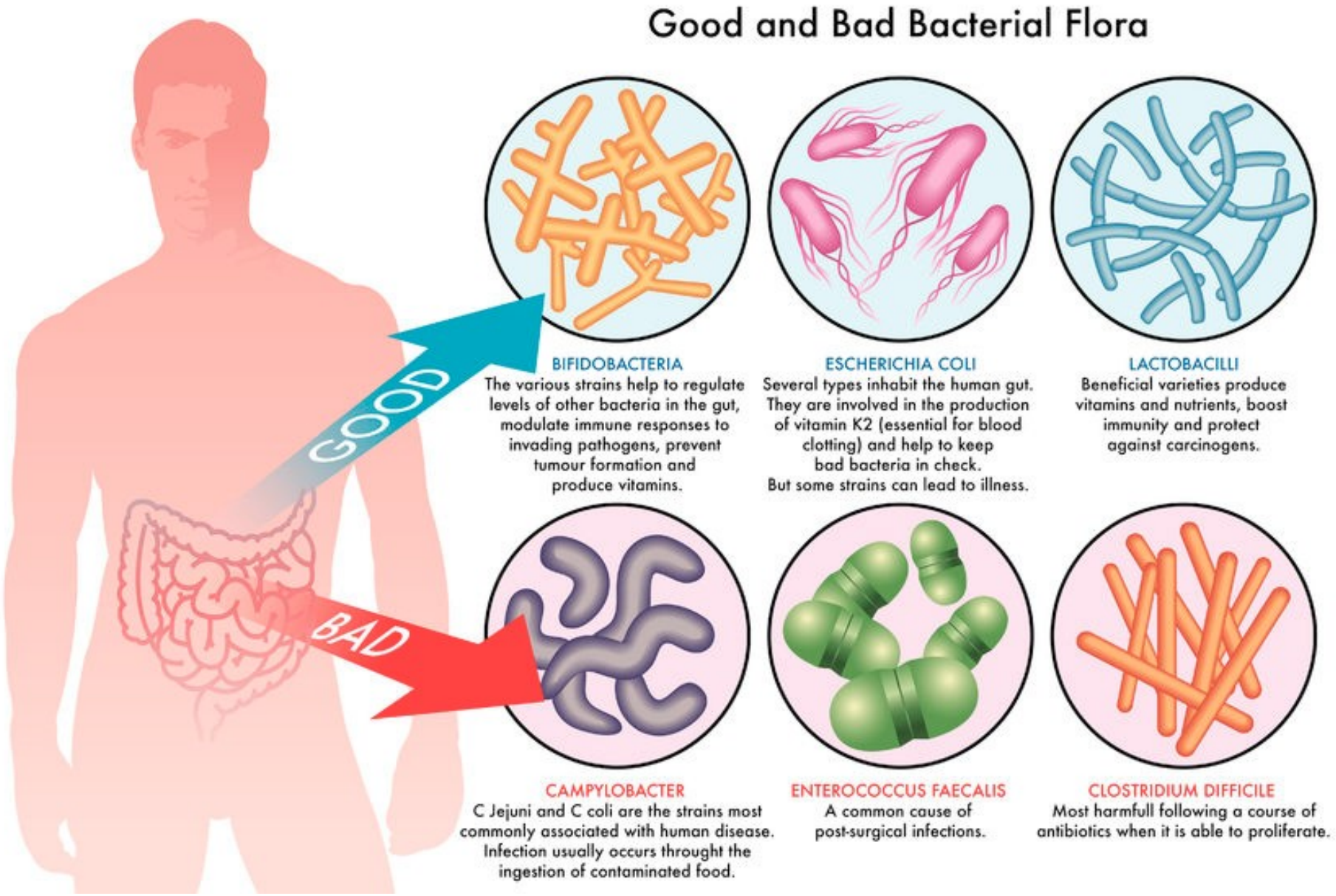
Introduction

Disease Background

- Allergies are a condition where the immune system produces an exaggerated response to an allergen

- In the United States in 2016:
  - 7.6 million children had a respiratory allergy
  - 4.5 million children had a food allergy
  - 8.9 million children had a skin allergy



Marple, T. (n.d.). [Digital image]. Retrieved November 27, 2018, from https://www.intentio.com/gut-microbiota-poor-energy-levels/

Introduction

Review of Literature

- Breastfeeding has benefits for diabetes and intestinal health [1-3], but the relationship with allergies is still unclear

- For eczema, one study found it to be **protective** [4], another to be a **risk factor** [5], and a third found **no association** [6]

- Inconsistent findings for food allergies [8, 9]

- For asthma, its mostly found to be protective [7]
  - Stratifying by age detected decreasing protection

Introduction

Primary Objective

- To determine if breastfeeding results in a lower prevalence of allergies in children 0-5 years old in the US

Secondary Objective

- To evaluate if any protection levels afforded changed as children became further removed from breastfeeding

Materials and Methods

Data

- The data for this study comes from the 2016 National Survey of Children's Health
  - National sample of 364,150 households
  - Collects information on children ages 0 – 17

- Inclusion criteria:
  - ✓ 5 or younger
  - ✓ Answered survey question regarding the diagnosis of an allergy

- In total, 14,458 records were available

Materials and Methods

Outcome and Exposure:

- ✔ Allergies
- ✔ Breastfeeding duration (*never, < 6 months, 6 to 12 months*, and *>12 months*)

Other covariates:

- ✔ Sociodemographic: sex and race
- ✔ Smoker in household
- ✔ Age of first formula (*never, before 6 months, 6 months or afte*r)
- ✔ Age of first solids (*not yet, before 6 months, 6 months or afte*r)
- ✔ Access to nutritious meals (*always, sometimes, infrequently*)
- ✔ Months removed from last breastfeeding

Results

Table 1. Weighted distribution of covariates among children 0-5 with and without allergies. Except where noted, values indicate percentages.

	Present allergies (weighted N = 3,842,908)	**No allergies** (weighted N = 19,815,409)
Breastfed duration *		
Never	896,013 (18.0%)	4,081,665 (82.0%)
< 6 months	1,462,154 (16.7%)	7,303,552 (83.3%)
6 to 12 months	710,604 (13.5%)	4,563,701 (86.5%)
> 12 months	614,342 (18.4%)	2,725,052 (81.6%)
Sex		
Male	98,773 (15.7%)	255,846 (84.3%)
Female	109,671 (16.8%)	243,217 (83.2%)
Race *		
Hispanic	779,757 (14.3%)	4,670,977 (85.7%)
White	2,025,807 (16.2%)	10,454,495 (83.8%)
Black	634,480 (22.8%)	2,154,550 (77.2%)
Other/Multiracial	402,864 (13.7%)	2,535,387 (86.3%)
Smoker in household		
Yes	655,829 (18.9%)	3,129,239 (81.1%)
No	2,817,207 (15.9%)	16,576,756 (84.1%)

Results

Table 1. Weighted distribution of covariates among children 0-5 with and without allergies. Except where noted, values indicate percentages.

	Present allergies (weighted N = 3,842,908)	**No allergies** (weighted N = 19,815,409)
First formula		
Before 6 months	2,801,536 (17.0%)	13,672,663 (83.0%)
6 months or after	274,079 (18.3%)	1,225,300 (81.7%)
Never	668,792 (13.9%)	4,152,650 (86.1%)
First solids *		
Before 6 months	2,774,147 (17.1%)	13,443,713 (82.9%)
6 months or after	720,855 (16.5%)	3,642,073 (83.5%)
Never	149,389 (9.3%)	1,460,096 (90.7%)
Access to nutritious meals *		
Always	2,301,338 (14.4%)	13,659,427 (85.6%)
Sometimes	1,154,256 (20.3%)	4,546,878 (79.7%)
Infrequently	293,981 (22.2%)	1,029,471 (77.8%)
Months since last breastfed * $\bar{X}$(SE)	42.7 (0.8)	34.0 (0.48)

Results

Table 2. Crude prevalence ratios for allergies under different breastfeeding duration.

	Prevalence ratio	**95% CI lower**	**95% CI upper**
Breastfed duration			
Never	1.00	-	-
< 6 months	0.91	0.71	1.17
6 to 12 months	**0.71**	**0.54**	**0.93**
> 12 months	1.03	0.75	1.40

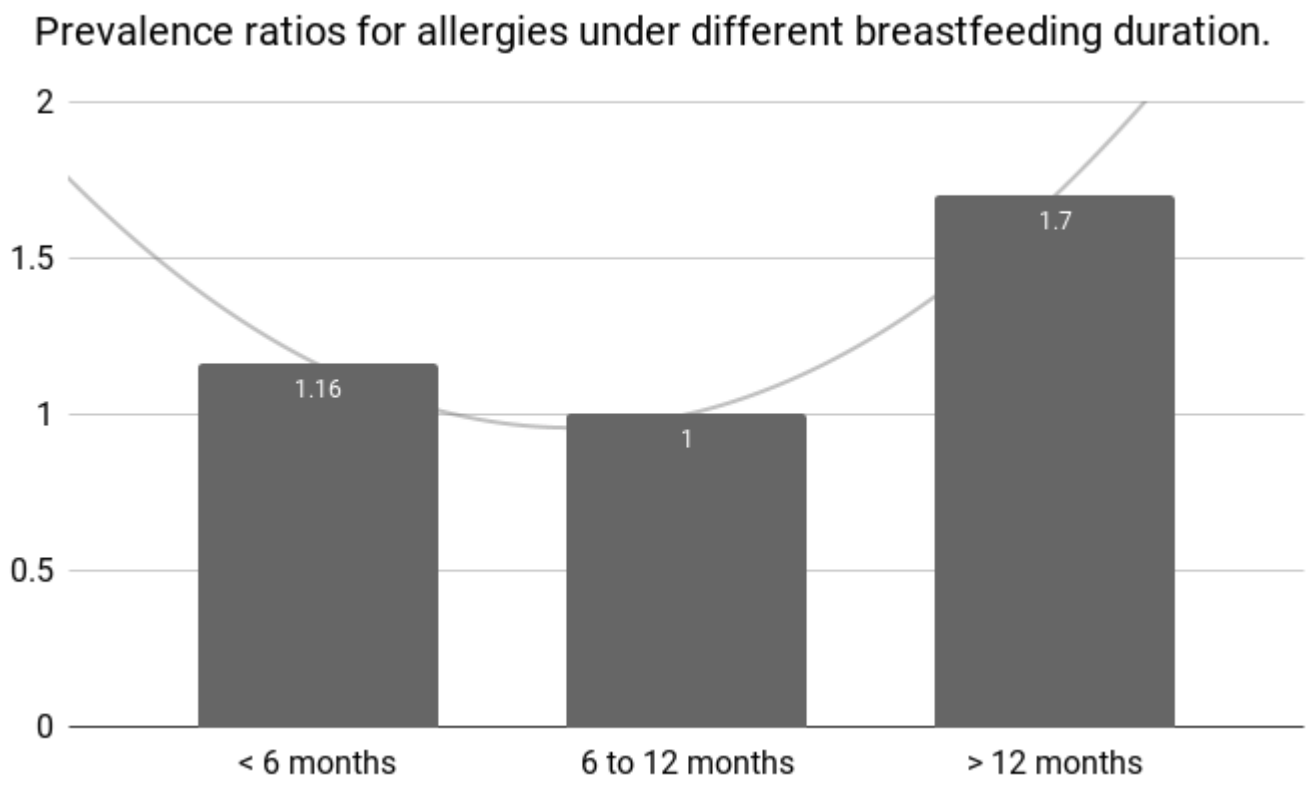
Results

Table 3. Adjusted prevalence ratios for allergies under different breastfeeding duration.

	Prevalence ratio	**95% CI lower**	**95% CI upper**
Breastfed duration			
Never	1.00	-	-
< 6 months	1.16	0.89	1.51
6 to 12 months	1.00	0.75	1.33
> 12 months	**1.70**	**1.20**	**2.42**

- Model adjusted for *Time of first solids, race, access to nutritious meals* and the *number of months since last breastfed.*

Results


Prevalence ratios for allergies under different breastfeeding duration.
2
1.5
1
0.5
0
1.16
1
1.7
< 6 months
6 to 12 months
> 12 months

Results

Secondary Objective

- Effect modification is present with borderline significance (*p = 0.046*)

- Term is only significant for children who had a breastfeeding duration of 6 to 12 months (*p = 0.013*)

- When *months since last breastfed = 0* there is a 40% decrease in the prevalence of allergies (*p = 0.03*). There is approx. 1.0% decrease in this reduction per each month removed.

Conclusions

- Breastfeeding less than 6 months does not appear to affect allergy prevalence

- Breastfeeding between 6 to 12 months results in up to a 40% decrease in prevalence but each month removed is going to reduce this by 1.0%

- Breastfeeding more than 12 months appears to be associated with an increased prevalence

Conclusions

Strengths and Limitations

- ✔ Large sample size
- ✔ Missingness did not alter results
- ✔ New covariates were considered

- ✗ Misclassification (e.g., access to nutritious meals)
- ✗ Residual confounding
  - ✗ No information on the nutrition and health background of the mother
- ✗ No analysis by specific allergy type.

Questions

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