
The effects of infant feeding practices on food sensitization in a Canadian birth cohort

Chanchlani Fellows Seminar

Maxwell Tran

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Disclosures

Conflicts of interest: None

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The data presented here are confidential and subject to revision.

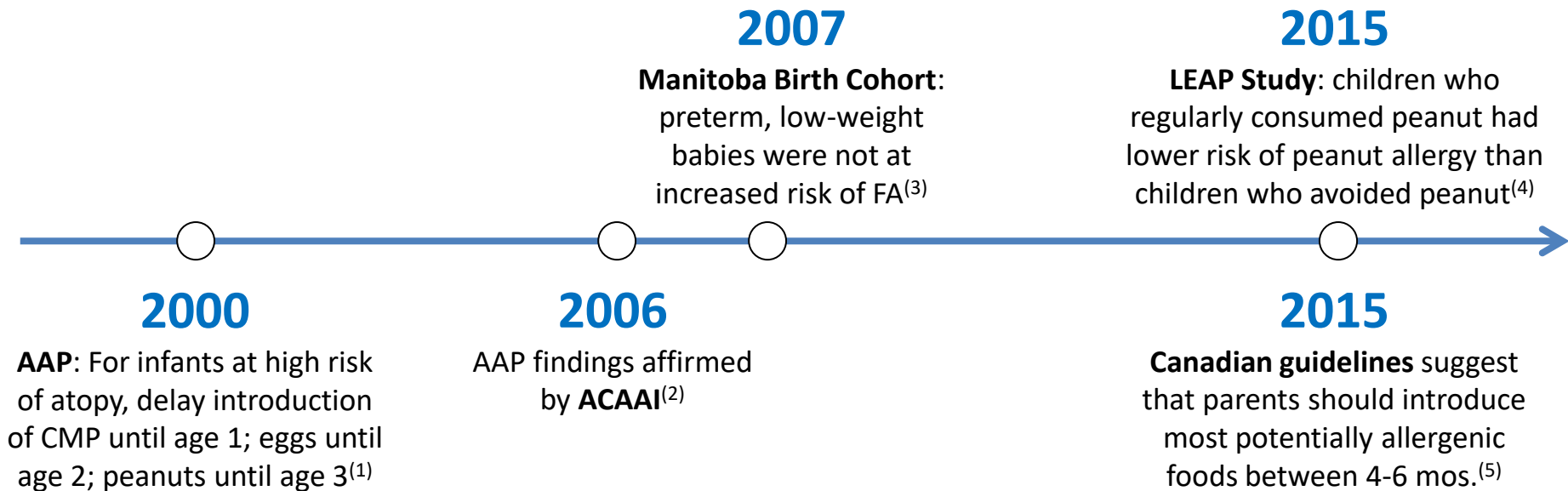


Abbreviations

AAP	American Academy of Pediatrics
ACAAI	American College of Allergy, Asthma, and Immunology
AD	atopic dermatitis
adjOR	adjusted odds ratio
CHILD	Canadian Healthy Infant Longitudinal Development (Study)
CI	confidence interval
CMP	cow's milk products
FA	food allergy
IgE	immunoglobulin E
LEAP	Learning Early about Peanut Allergy
mos.	months
SES	socioeconomic status
SPT	skin prick test

Background and rationale

- The evidence regarding infant feeding practices, especially **timing of food introduction**, has remained controversial



Background and rationale

- Food sensitization is an **IgE-mediated response** to a food allergen, demonstrated by a **positive SPT**
- Food sensitization in early childhood is a **known risk factor** for asthma, eczema, and allergic rhinitis in later childhood⁽⁶⁾
- Food sensitization is also on the pathway to food allergy
- CHILD is a **general population-based prospective birth cohort** with parent-reported infant nutrition data and clinical SPT data



CHILD Study
HELP CHILDREN
GROW UP HEALTHY



Background and rationale

Research question:

- What is the association between *infant feeding practices in the first year of life* and *food sensitization at age 1 year*?

Hypothesis:

- Earlier food introduction decreases the risk of food sensitization



Methods: Questionnaire data

- For our analyses, **nutrition data** were prospectively collected at ages 3, 6, and 12 months
 - CMP = regular cow's milk, dairy products (e.g., yogurt, cheese, ice cream, butter), cow's milk-based formula
- Timing of introduction to CMP, egg, and peanut was classified as:
 - 0-6 months
 - 7-12 months
 - >12 months
- **Demographic data** included study center, child gender, birth order, mode of delivery, parental ethnicity, and household income



Methods: Skin prick testing

- At age 1, children underwent skin prick testing to cow's milk, egg white, and peanut
- Food sensitization was defined as one or more positive skin prick tests
 - Wheal diameter ≥ 2 mm over glycerin control



Methods: Statistical analyses

- The **2125 children** included in our analyses were from the General cohort, had data available for timing of food introduction, and underwent skin testing between 9-18 months of age
- Potential confounders were assessed pairwise for associations with each food sensitization outcome
- Logistic regressions were fitted to assess the associations between timing of food introduction and food sensitization at age 1 year

Results

1. Characteristics of study sample

		n = 2125
Study center	Toronto	22%
	Manitoba	36%
	Edmonton	16%
	Vancouver	25%
Child gender	Male	54%
Mother atopy	Atopic	58%
Father atopy	Atopic	68%
Mother ethnicity	Caucasian	76%
Father ethnicity	Caucasian	76%

Results

		n = 2125
Introduction to CMP	0-6 mos.	45%
	7-12 mos.	52%
	>12 mos.	3%
Introduction to egg	0-6 mos.	3%
	7-12 mos.	76%
	>12 mos.	21%
Introduction to peanut	0-6 mos.	1%
	7-12 mos.	36%
	>12 mos.	63%
Sensitization at age 1	Cow's milk	2%
	Egg white	7%
	Peanut	5%
	Any of three tested food allergens	11%

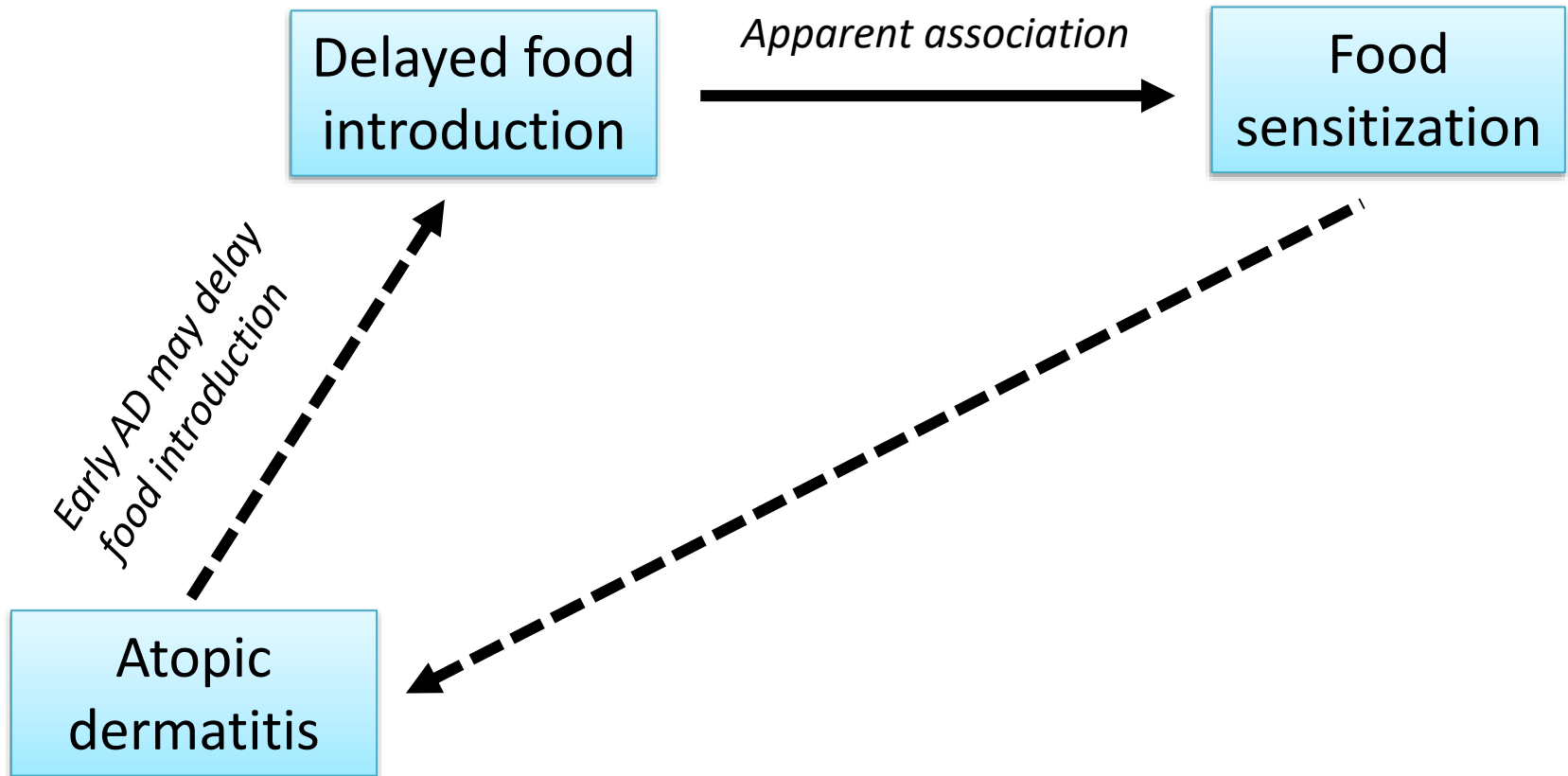
Results

2. Delayed food introduction increased the risk of food sensitization at age 1*

Timing of introduction	n	adjOR (95% CI) Milk/Egg/Peanut sensitization	adjOR (95% CI) Food-specific sensitization
Introduction of CMP			
0-6 months	957	0.82 (0.60, 1.11)	0.31 (0.12, 0.71)
7-12 months	1095	1.00 (Reference)	1.00 (Reference)
≥ 12 months	73	1.55 (0.76, 2.96)	4.53 (1.72, 10.77)
Introduction of egg			
0-6 months	69	1.02 (0.40, 2.22)	1.03 (0.33, 2.53)
7-12 months	1611	1.00 (Reference)	1.00 (Reference)
≥ 12 months	445	2.10 (1.51, 2.90)	1.91 (1.28, 2.80)
Introduction of peanut			
0-12 months	780	1.00 (Reference)	1.00 (Reference)
≥ 12 months	1345	1.57 (1.13, 2.21)	1.83 (1.11, 3.12)

*Results adjusted for study center, parental atopy, and parental ethnicity

An Aside on Reverse Causality



Results

3. Trend of effects remained after excluding children with atopic dermatitis before age 6 months*

Timing of introduction	n	adjOR (95% CI) Milk/Egg/Peanut sensitization	adjOR (95% CI) Food-specific sensitization
Introduction of CMP			
0-6 months	516	0.96 (0.56, 1.61)	0.53 (0.13, 1.75)
7-12 months	593	1.00 (Reference)	1.00 (Reference)
≥ 12 months	36	1.92 (0.57, 5.26)	2.08 (0.20, 10.90)
Introduction of egg			
0-6 months	34	0.29 (0.00, 2.17)	0.47 (0.00, 3.64)
7-12 months	881	1.00 (Reference)	1.00 (Reference)
≥ 12 months	230	2.43 (1.40, 4.15)	2.52 (1.40, 4.15)
Introduction of peanut			
0-12 months	443	1.00 (Reference)	1.00 (Reference)
≥ 12 months	702	1.56 (0.91, 2.76)	2.43 (0.98, 7.08)

*Results adjusted for study center, parental atopy, and parental ethnicity

Results

Summary of Key Findings

- Most parents introduced CMP early but delayed introduction of egg and particularly peanut
- At age 1 year, 11% of children were food-sensitized, with highest prevalence of egg white sensitization (7%)
- Delayed introduction of CMP, egg, and peanut after age 1 increased the odds of sensitization to the corresponding food allergens, after adjusting for study center, parental atopy, and parental ethnicity
- The trend of effects remained after assessing potential reverse causality

Discussion

Enquiring About Tolerance (EAT) Study



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ORIGINAL ARTICLE

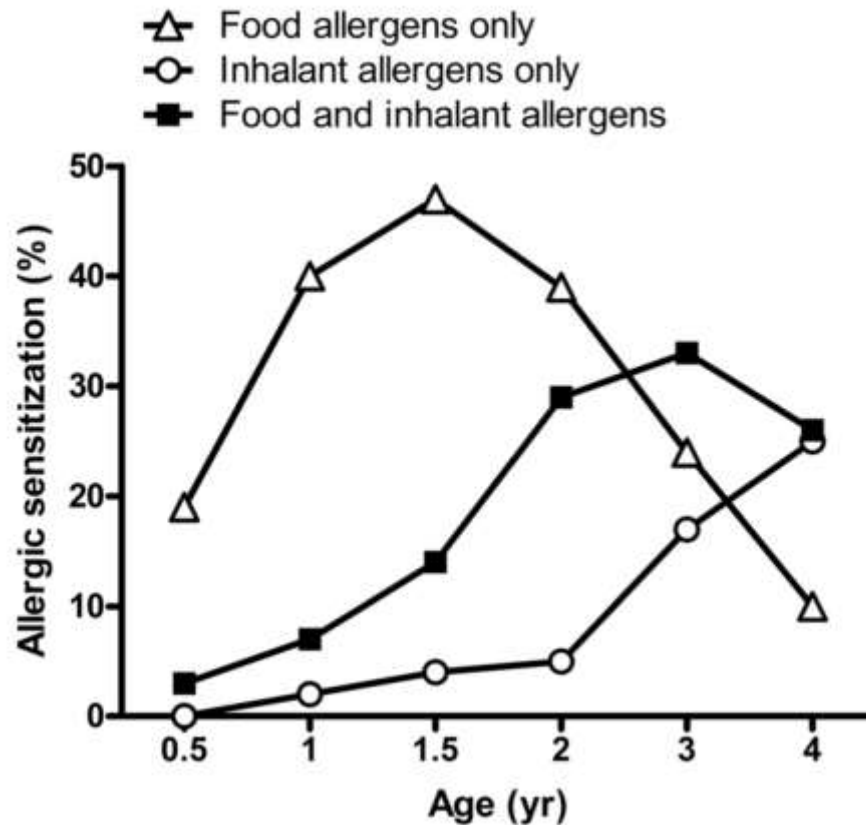
Randomized Trial of Introduction of Allergenic Foods in Breast-Fed Infants

Michael R. Perkin, Ph.D., Kirsty Logan, Ph.D., Anna Tseng, R.D., Bunmi Raji, R.D., Salma Ayis, Ph.D., Janet Peacock, Ph.D., Helen Brough, Ph.D., Tom Marrs, B.M., B.S., Suzana Radulovic, M.D., Joanna Craven, M.P.H., Carsten Flohr, Ph.D., and Gideon Lack, M.B., B.Ch., for the EAT Study Team*

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Discussion

- To our knowledge, this study is the first to determine the effects of timing of food introduction to CMP, egg, and peanut, on food sensitization at age 1 year in a general population-based cohort



Chiu et al. *PLoS ONE* 2014.

Discussion

Strengths

- Prospective data collection reduced recall bias
- Large sample size
- Statistical adjustment for potential confounding variables
- Considered potential reverse causality

Discussion

Limitations

- Did not use daily food diaries
 - Recall bias
 - Foods besides CMP, egg, and peanut were not captured
- There were some contradictory feeding reports from parents
 - First positive report of feeding was used to limit recall bias
 - Ranges of timing of food introduction were expanded
- Issues of generalizability
 - High SES cohort; high rates of parental atopy

Conclusions

- Introducing cow's milk products, egg, and peanut after age 1 increased the risk of sensitization to the corresponding food allergens in a general population-based cohort
- Our findings reinforce the paradigm shift from delayed food introduction and food avoidance to earlier food introduction for allergy prevention

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Thank you.

Questions?