



# **Milk based formula intolerance as an early predictor for Eosinophilic Esophagitis (EoE)**

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# Background

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- While a genetic predisposition has been identified for Eosinophilic Esophagitis (EoE), studies have also suggested that early life exposures, such as diet, may play a role.
- Study results are mixed regarding the effect of breastfeeding on the development of EoE.
- Little has been studied with regard to formula intake and the development of EoE.



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# Background

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- According to NHANES data from 2003 to 2010, 68.9% of children had consumed cow's milk formula (standard) the day prior to examination
  - Soy: 11.6%
  - Specialty formula: 6.3%
  - Gentle/Lactose Reduced: 5.4%
  - Nonformula milk products: 12.6%



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# Knowledge Gap

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- Question: Does formula feeding play a role in the development of EoE?
- Hypothesis: Formula feeding enhances the development of EoE.



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# Methods

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- After IRB approval, patients with EoE seen in our Penn State Health Pediatric Allergy-Immunology clinic were identified.
  - Inclusion criteria:
    - Patients <18 years
    - Diagnosed with EoE as indicated by ICD 10 code and  $\geq 15$  eosinophils/HPF
  - Exclusion criteria:
    - Patients with secondary causes of esophageal eosinophilia
- A retrospective chart review was done to collect demographic data.
- A phone survey/clinic survey was completed by parents regarding dietary habits of their child during infancy.



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# Demographics

**Table 1. Demographics**

Average age at time of survey	10.1 years
Average age at time of diagnosis	7.4 years
Gender, % male, n=27	85% (23)
Ethnicity, n=27	
%Caucasian	59% (16)
%Hispanic/Latino	0
%Black or African American	11% (3)
%Asian	0
%More than one race	11% (3)
%Unknown	19% (5)



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# Results

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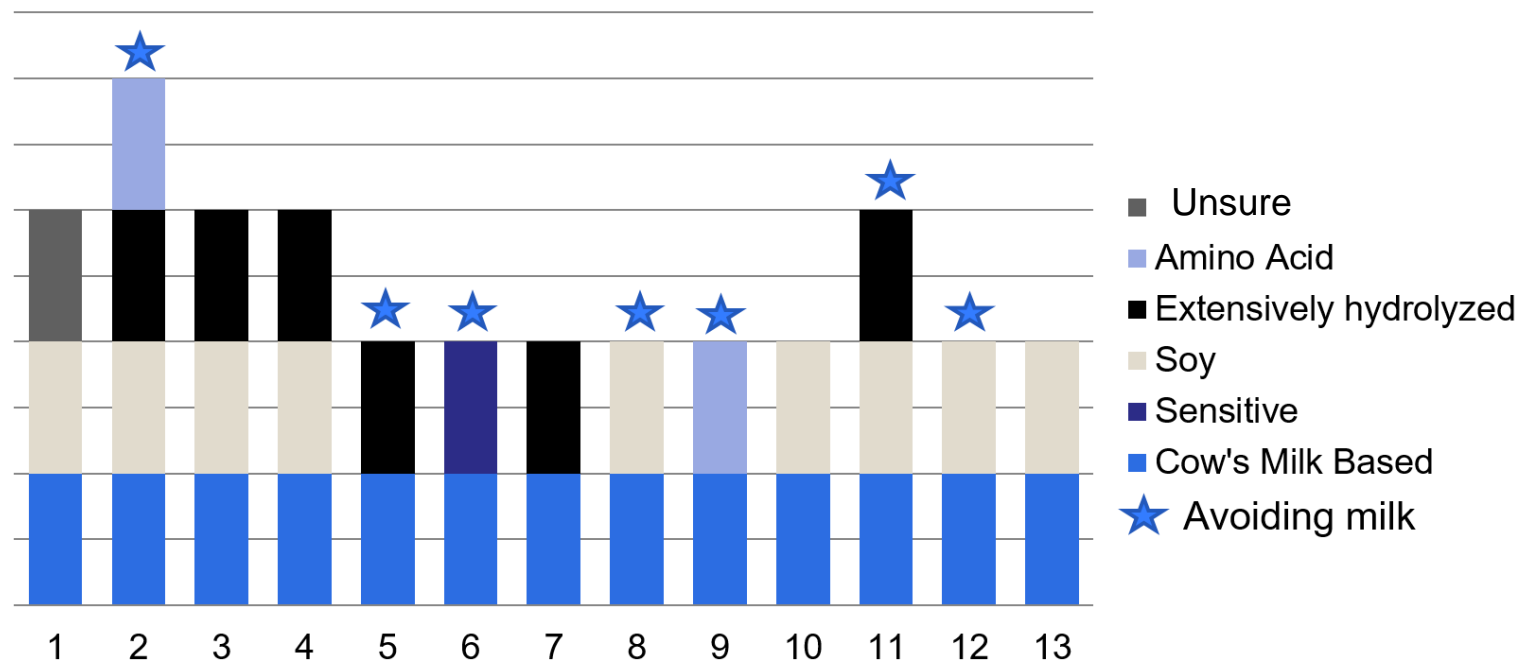
- Breastfeeding was initiated in 78% (21/27) of patients.
  - 66.67% (14/21) of those who were breastfed were exclusively breastfed for some duration of time.
- 85% of patients (23/27) were formula fed either exclusively or in addition to breastfeeding.
- 57% (13/23) patients were switched to a non-standard formula (sensitive, soy, partially hydrolyzed, hydrolyzed) either by physician recommendation or parental choice.



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# Results

Different formulas trialed in 13 patients who switched to nonstandard formula





# Discussion

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- While the number of patients who were breastfed nears national comparisons (83%), many patients received formula as a primary source of nutrition during infancy
- 57% of patients later diagnosed with EoE had been switched to a non-standard formula during infancy
  - This was higher than compared to 23.3% of all-comers in the NHANES data who consumed non-standard formula



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# Conclusions

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- Formula intolerance, indicated by switching to a different formula protein source, was common in our patients.
- Milk-based formula intolerance may be an early indicator for the later development of EoE.



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# Future Directions

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- Complete a study to investigate reasons behind patients switching formula
  - Vomiting/reflux may be more predictive of EoE than switching for colic, family history, fussiness



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