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BACKGROUND

- Anaphylaxis is an acute, serious, life threatening allergic reaction usually affecting multiple body systems.[1]
- Incidence of anaphylaxis is increasing; one study showed diagnosis doubling from 5.7 to 11.7 patients per 10,000 pediatric ED visits from 2009 to 2013.[2, 3]
- Given the need for rapid intervention, accurate diagnosis of anaphylaxis in children who present to the emergency department with allergic symptoms is imperative.
- We aim to identify clinical characteristics of children with allergic reactions that can predict which patients are more likely to develop anaphylaxis.

STUDY DESIGN and METHODS

- Charts of 325 pediatric patients who presented to a pediatric ED from 2013-2015 with allergic reactions were reviewed.
- The NIAID/FAAN diagnostic criteria (Fig. 1.) were used to classify patients with and without anaphylaxis.[4]
- Univariate analysis was conducted to compare patient characteristics of those with and without anaphylaxis.
- Variables that showed bivariate association with the dependent variable at a level of $p < 0.05$ were included in a stepwise logistic regression model to identify independent association of patients' characteristics with the development of anaphylaxis.

RESULTS

- 18.2% of patients met criteria for anaphylaxis, with inclusion of at least two of the following symptoms: skin/mucosal (98.3%), respiratory (78.0%), and/or gastrointestinal (11.9%).
- Patients with anaphylaxis were more likely to be older than those without (13.8 +/- 6.2 vs. 10.1 +/- 7 years, $p < 0.01$).
- Asthma, food allergy, drug allergy and history of prior anaphylaxis were more likely in patients with anaphylaxis compared to those without anaphylaxis. (Fig.2.)
- Swelling, paresthesia, dyspnea, and wheezing were found significantly more frequently in patients with anaphylaxis compared to those without anaphylaxis. (Fig.3.)
- Involvement of the lips, tongue, and/or throat were more likely recorded in patients with anaphylaxis. However, torso and arms/hand involvement were seen more in patients without anaphylaxis. (Fig.4.)
- The most common allergen associated with anaphylactic reactions was food (71.2% vs. 33%, $p < 0.001$). (Fig.5.)
- Patients with a nonanaphylactic reaction were twice more likely (36.0% vs. 15%) to not have a known trigger. (Fig.5)
- Regression analysis confirmed independent role of these factors in prediction of anaphylaxis.

Fig. 1. Anaphylaxis is highly likely when any one of the following criteria are fulfilled

- Acute onset of illness with involvement of skin, mucosal tissue, or both
 - AND at least ONE of the following:
 - Respiratory compromise
 - Reduced blood pressure or associated symptoms of end-organ dysfunction
- Two or more of the following that occur rapidly after exposure to a likely allergen for that patient
 - Involvement of the skin/mucosal tissue
 - Respiratory compromise
 - Reduced blood pressure or associated symptoms
 - Persistent gastrointestinal symptoms
- Reduced blood pressure after exposure to known allergen for that patient
 - Infants and children: low systolic blood pressure or greater than 30% decrease in systolic blood pressure
 - Adults: systolic blood pressure of less than 90 mmHg or greater than 30% decrease from that patient's baseline

Fig. 2. Comparison of Allergy Related Morbidities

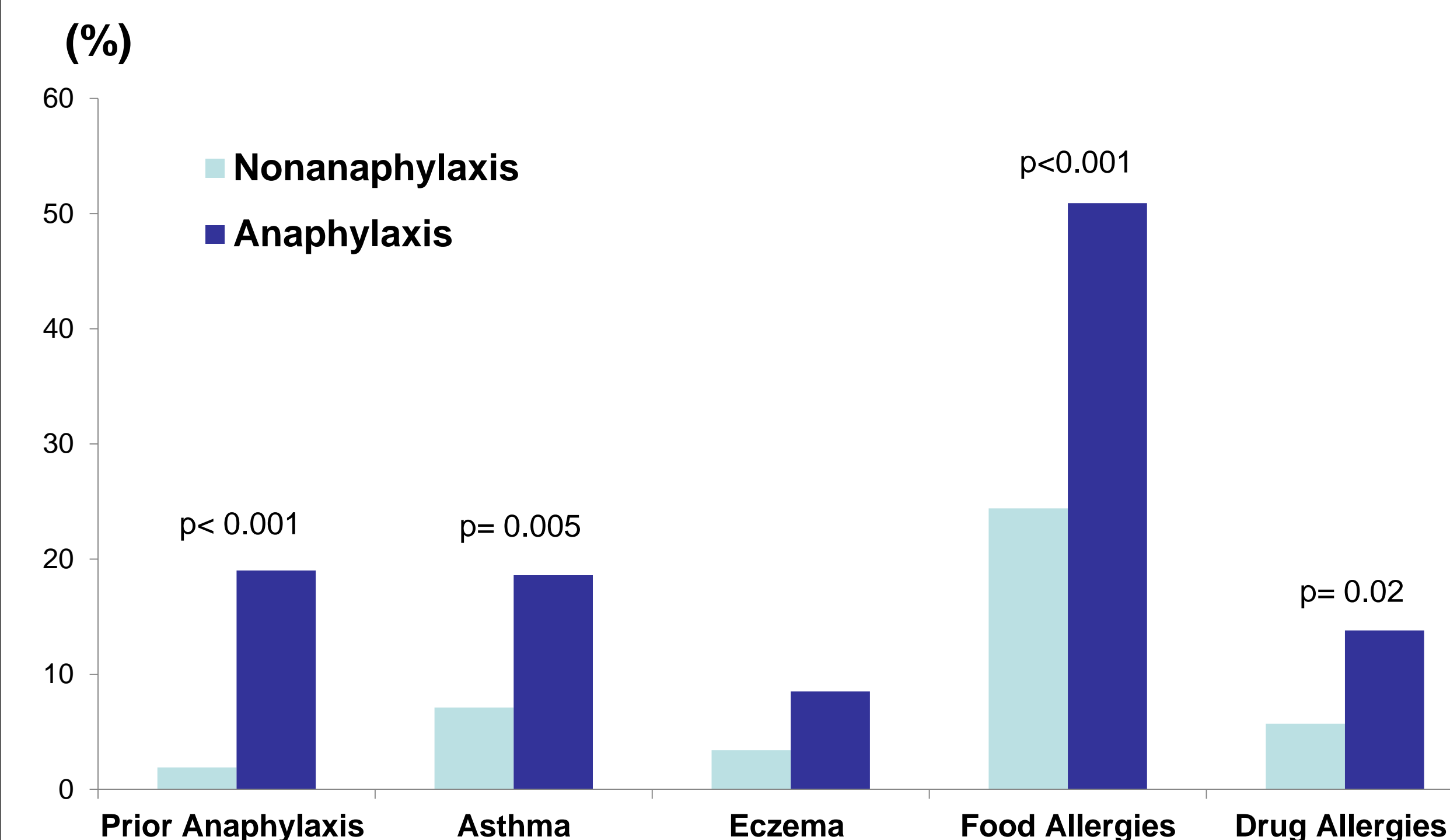


Fig. 3. Comparison of Symptoms Based on Presentation.

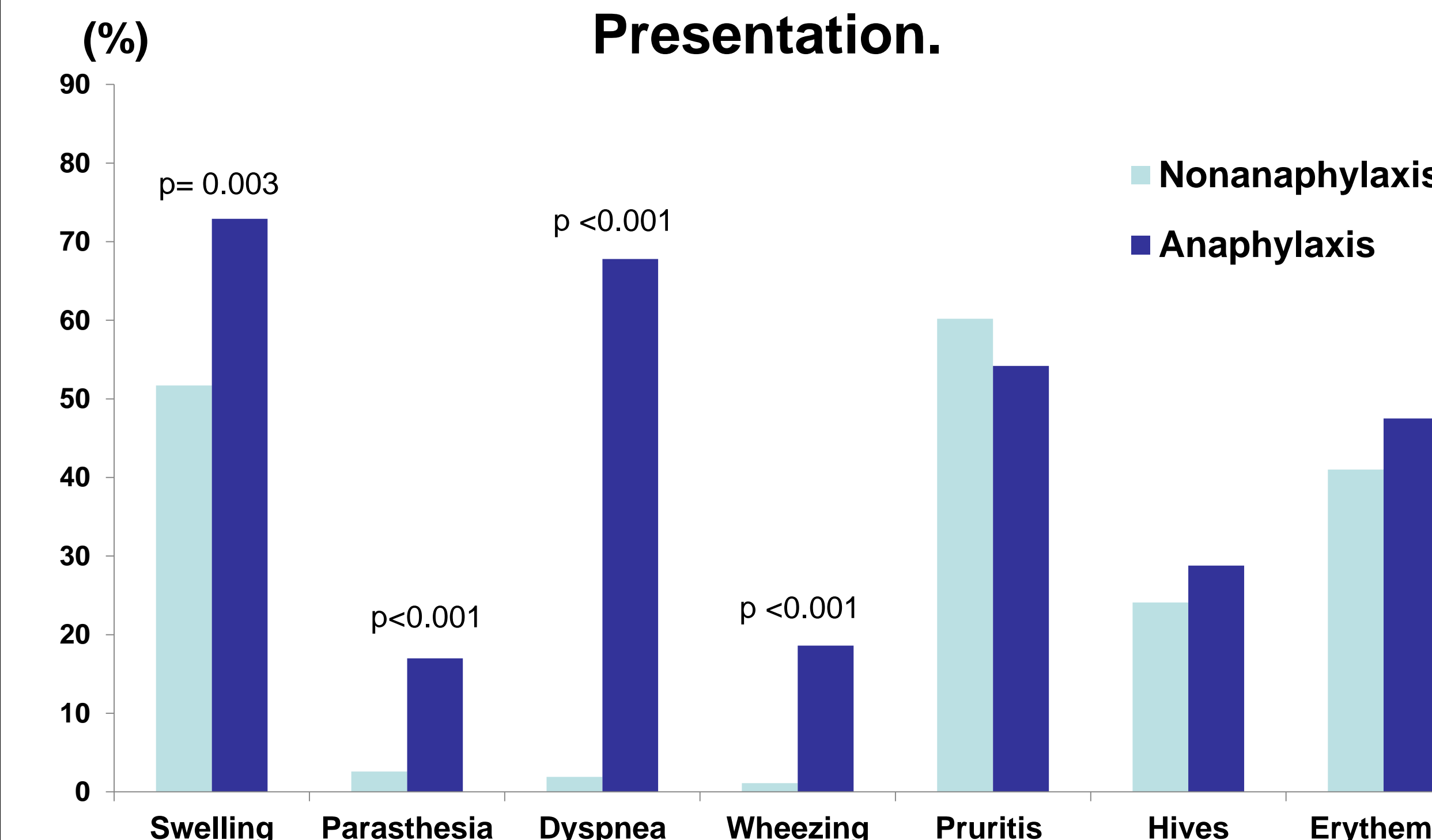


Fig. 4. Comparison of Symptom Location

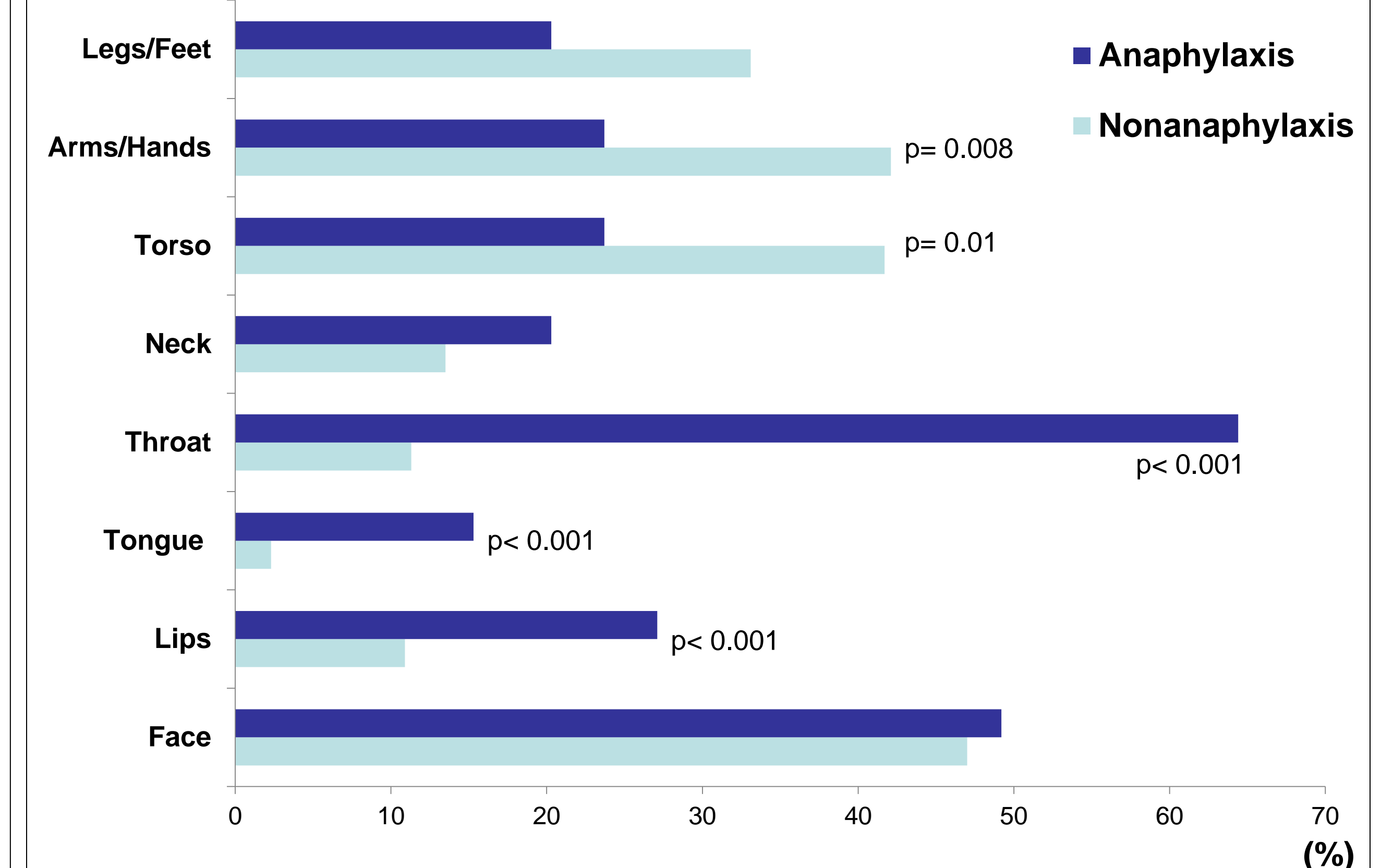
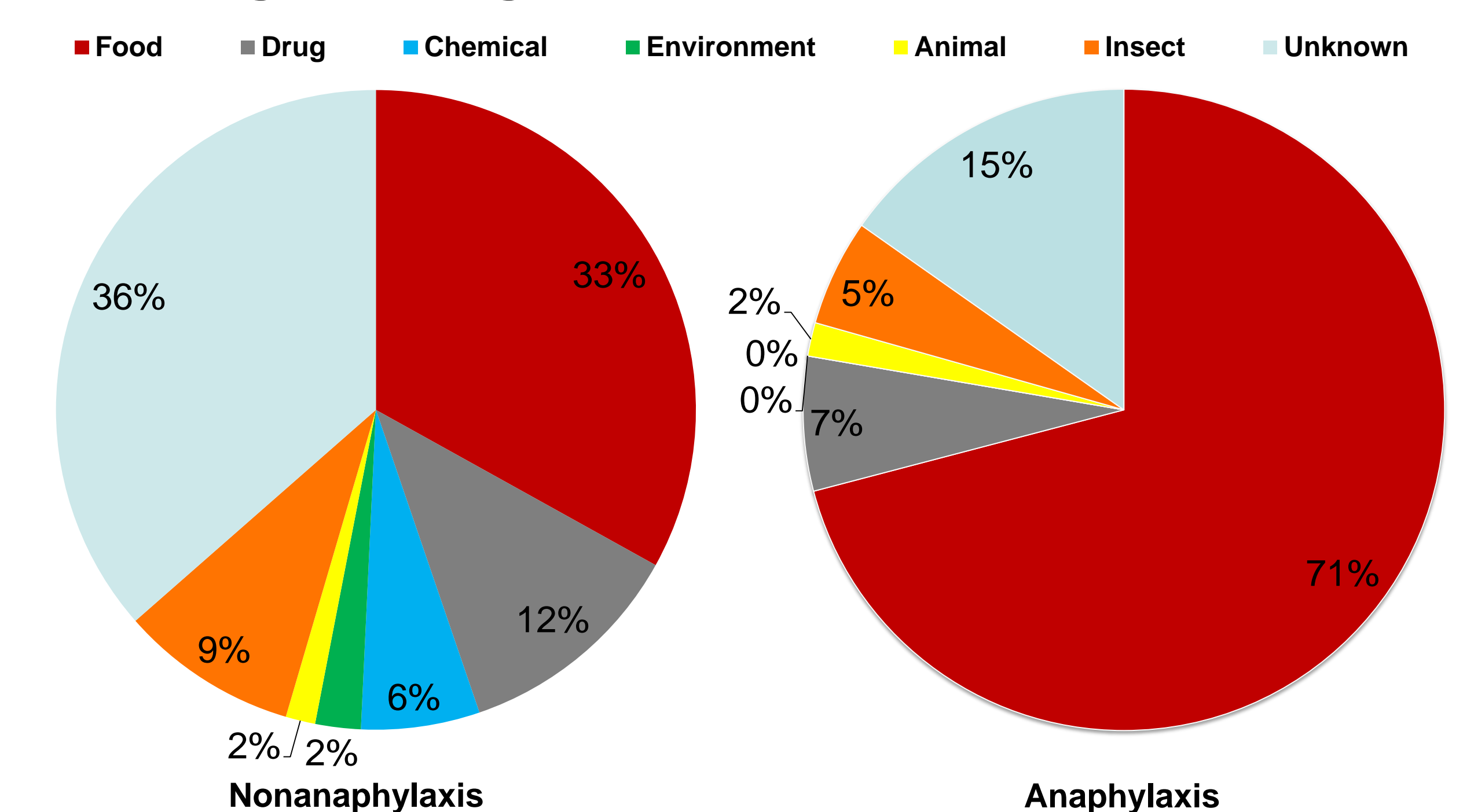


Fig. 5. Allergen Exposure Prior to Reaction



CONCLUSION

- In pediatric patients presenting with an allergic reaction, older age, history of allergic-related morbidities, including asthma, food, and/or drug allergy are factors that predict the likelihood of anaphylaxis.
- Swelling, paresthesia, dyspnea, wheezing, and involvement of lips, tongue, and throat are symptoms significantly more likely to be found in anaphylactic cases.
- Allergic reactions without anaphylaxis are more likely to: have an unknown cause for their reaction, and have symptoms affecting their torso, arms, and/or hands.

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