

## The US Food Allergy Patient Registry for Characterizing Biphasic Food-Related Allergic Responses

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### Abstract

16.4% (95% CI, 15.3-17.7) of reported biphasic responses occurred. Biphasic reactions were reported by a total of 21.8% of self-respondents (95% CI, 19.7-23.8) and 12.8% of parent or guardian respondents (95% CI, 12.5-14.3) during their most recent food-allergic reaction. Compared to 30% of those who experienced a very severe initial reaction, 7.4% of those who experienced a mild initial reaction did so. When the initial reaction was light, 52.0% of self-respondents (95% CI, 38.0-35.7) and 69.6% of parent or guardian respondents (95% CI, 47.2-85.4) reported a mild secondary reaction. 36.3% of parent or guardian respondents (95% CI, 26.4-47.5) and 42.9% of self-respondents (95% CI, 31.1-55.5) with a biphasic reaction reported a very severe secondary reaction when the original reaction was very severe. Increased probabilities of a biphasic reaction were linked to female sex, Black race, reaction age 5–12 and 26–66 years, first moderate, severe, or very severe reaction, and one or more yearly reactions.

**Keywords:** Biphasic food; Food allergy; Biphasic reaction

### Introduction

In the United States, food allergy (FA) affects 10% of adults and 8% of children, making it a significant public health concern. According to studies, around half of children and adults with FA have severe symptoms. Every year, one in five kids<sup>1</sup> and one in ten adults<sup>2</sup> go to the emergency room (ED) with symptoms of food allergy responses. Over the previous ten years, there have been between five and ten deadly food reactions reported in the United States<sup>3</sup> [1-5].

### Features of the respondent

There were 1531 self-respondents and 2258 parents or guardians among respondents who completed the FA Response survey and met the inclusion requirements as of March 2020 (n = 3789). (Table I). In comparison to parent or guardian respondents, the majority of self-respondents were female (86.0%; 95% CI, 84.2-87.7) while the majority of children and young adults were male (61.1%; 95% CI, 59.1-63.1).

Dual food allergy reactions have been classified as biphasic in existing literature, which is defined as the emergence of symptoms following the remission of the initial reaction without re-exposure to the trigger [6].

Although reactions have happened up to 72 hours after the initial reaction, current guidelines indicate monitoring patients for 4 to 6 hours, 1 hour for patients at low risk for biphasic reactions, and 4 to 6 hours for everyone else. 7 Biphasic reactions can occur anywhere from 1% to 20% of the time. There are various risk variables and there are 8, 9, 10, 11, 12, and 13 cases of anaphylactic responses. Delay in epinephrine, for instance, is a significant risk factor<sup>8, 14, 15, and 16</sup>. Moreover, research indicates that people with biphasic reactions can need numerous doses of epinephrine to treat the first symptoms. Another risk factor is hypotension<sup>18</sup>; European recommendations<sup>19</sup> call for a prolonged monitoring time for juvenile hypotensive patients [7-10].

There are still gaps in the research discussing biphasic reactions, despite growing knowledge of the severity of non-biphasic food-related allergic reactions. Using information from oral food challenges or reactions assessed by ED doctors, the majority of incidence estimates are predicated. Nothing is known, however, concerning the frequency of biphasic reactions in people who experience moderate initial reaction

symptoms and are treated by the patient or their family. In order to describe the experiences of those who disclosed biphasic food-related allergy reactions during the most recent reaction, this study used a nationwide FA registry.

The Food Allergy Research and Education (FARE) Patient Registry, a national online database of data about FA, served as the study's data source. 33 clinical research centres of excellence across the United States and FARE's email list were used to tell potential respondents about the Registry. A respondent must report having had at least one case of FA that was diagnosed by a doctor, as well as having a documented medical history of FA, in order to be eligible to participate in the registry [10].

A typical type of acute transfusion reaction is an allergic transfusion reaction (ATR). The study's goal was to identify the clinical traits and prevalence of ATRs in kids. Children who received red cell concentrate (RCC), fresh frozen plasma (FFP), platelet concentrates (PC), apheresis granulocyte, and cryoprecipitate were included in this study. Records were kept of the patients' sociodemographic details, the blood component that triggered the reaction, its kind and timing, the patient's age at the time of the reaction, their diagnosis, the duration of the follow-up period, and clinical information. A total of 4193 kids had blood transfusions from 89703 bags of blood products. 157 individuals (3.74%) experienced 211 acute transfusion-related responses. Of them, 125 (or 59%) reactions were allergic. 125 out of 89703 infusions (0.14%) had ATR. The median transfusion time was 30 minutes, and the median patient age was 9.99 years (IQR: 4.67-14.38). 18 patients (18%) also had a history of adverse medication reactions. When the blood products that resulted in ATRs were evaluated, 43 (34.5%)

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**Received:** 3-Mar-2023, Manuscript No: jmir-23-90772, **Editor assigned:** 06-Mar-2023, PreQC No: jmir-23-90772 (PQ), **Reviewed:** 20-Mar-2023, QC No jmir-23-90772, **Revised:** 23-Mar-2023, Manuscript No: jmir-23-90772 (R); **Published:** 30-Mar-2023, DOI: 10.4172/jmir.1000174

**Citation:** Bernard J (2023) The US Food Allergy Patient Registry for Characterizing Biphasic Food-Related Allergic Responses. J Mucosal Immunol Res 7: 174.

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involved apheresis and single-donor PC, 37 (29.6%) involved FFP, 32 (25.6%) involved RCC, 10 (8%) involved pooled PC, 2 (1.6%) involved cryoprecipitate, and 1 (0.8%) involved apheresis granulocyte. 29 (21%) of the responses were anaphylaxis, and 89 (79%) were minor allergic reactions. Anaphylaxis had a statistically greater proportion of PCs than mild allergic responses ( $p=0.02$ ). Within the first hour after the transfusion, patients receiving PC should receive closer monitoring. It's possible that patients with ATR are more likely to have had prior medication responses.

## Discussion

We found that in a nationwide FA registry, one in five self-respondents and one in eight parent or guardian respondents reported having a biphasic reaction during the most recent food-related allergic reaction. According to our findings, 15.7% of self-respondents and 9.6% of parent or guardian respondents were unsure if they had gone through a biphasic reaction. We discovered a correlation between respondents' assessed initial reaction intensity and their perceived secondary reaction severity.

## Conclusion

Because self-report covers events that may have been cured with or without medical intervention, this study gives detailed incidence estimates of biphasic food-related allergic reactions. The study also shows a correlation between the intensity of the primary allergic reaction to food and the severity of the secondary reaction. Understanding the

likelihood and potential severity of biphasic reactions is made easier by these data.

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