

# The severity of allergic reactions in a real-world environment is independent of the eliciting amounts of foods.

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## Abstract

**Introduction** Patients with food allergies necessitate having personalized information on their risk of reaction in “real-life” situations. This multicentric study aimed to investigate the link during accidental reactions between the nature and amount of food allergens consumed in “real life situation” and the severity of the symptoms. **Methods** Patients were prospectively recruited from the 1<sup>st</sup> of December 2020 to the 31<sup>st</sup> of December 2021 at the emergency departments in the Geneva University Hospitals and local pediatric urgent care, through the allergology outpatient consultation, at school and daycare facilities and through their primary care physicians. Medical history of patients presenting reactions suggestive with immediate food allergy and suspected food samples were collected. Allergy diagnostic tests were retrospectively and prospectively collected. The samples were analyzed for their allergen content. **Results** We recruited 147 subjects with an accidental immediate-type allergic reaction to a food. We were able to collect 115 reaction-eliciting food samples allowing to quantify the allergen amount occasioning the reaction, as well as correlating this amount to the severity of the reaction. Children represented a large part of the reactors, and most reactions were to common food allergens such as tree nuts, cow’s milk as well as peanuts and hen’s egg. Reactions were mostly to pre-packaged foods and seven were to products with Precautionary allergy labeling, or without labelling to the corresponding allergen. Reactions were of various degrees of severity, and independent to the amount of allergen ingested. **Discussion** The severity of reactions did not show a direct correlation with allergen quantity, emphasizing individual sensitivity. Some reactions occurred with allergen amounts significantly below the legal limit for mandatory labelling of 1 g/kg in Switzerland. The study also highlighted considerable variability in allergen concentrations in foods labeled with possible “contaminations” or “traces.” These findings raise questions about the accuracy of allergen labeling and regulations.

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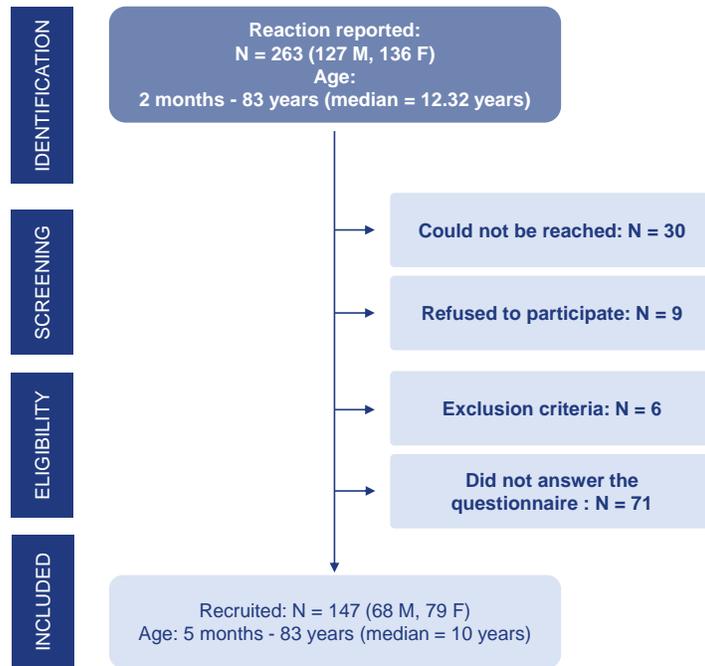
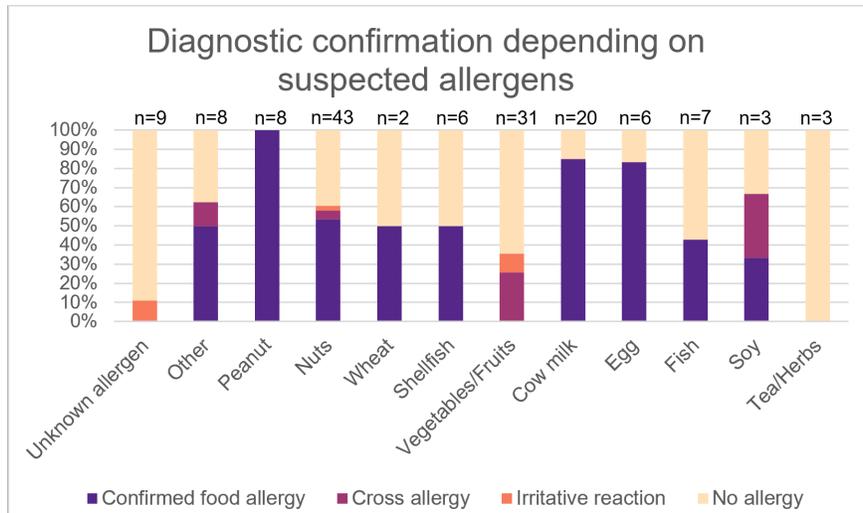
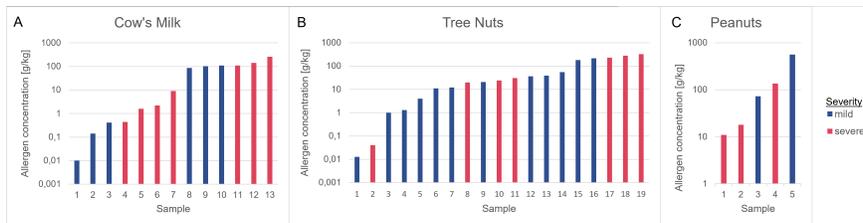


Figure 1: Recruitment flow chart.



**Figure 2:** Proportion of suspected allergens confirmed after allergy tests among patients with confirmed allergies, cross allergies or irritative reactions.



**Figure 3:** Allergen concentrations leading to mild and severe reactions. A) Nuts, B) Milk, C) Peanuts.

**Figure 4:** Allergen concentrations in foodstuff (A) and total amount of allergen consumed (B) leading to mild and severe reactions. No statistical differences are observed between both groups.

