

Probabilistic risk assessment of egg, hazelnut, milk, and peanut in Canadian food products with precautionary allergen labelling (PAL)

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Introduction

Allergic consumers need to fully avoid consumption of allergens, reducing their quality of life. The Canadian government has regulated the declaration of priority allergens as ingredients, but not the use of PAL for cross-contact allergens. Consequently, an increasing amount of risk-taking behaviour is seen in allergic consumers by consuming food products with PAL. There have been recent international efforts to standardise and improve the management of allergen cross-contact and the use of PAL when such contamination is unavoidable. An important management tool proposed is the use of threshold allergen doses as benchmarks for the use of PAL. However, there is a lack of knowledge of the actual risk associated with Canadian prepackaged products with PAL, while these labelling practices reduces the quantity of safe products available for allergic consumers [1]. Probabilistic risk assessment can estimate the risk of allergic reactions if consuming prepackaged products with PAL as well as the potential efficacy of eliciting doses as thresholds for PAL management.



Results

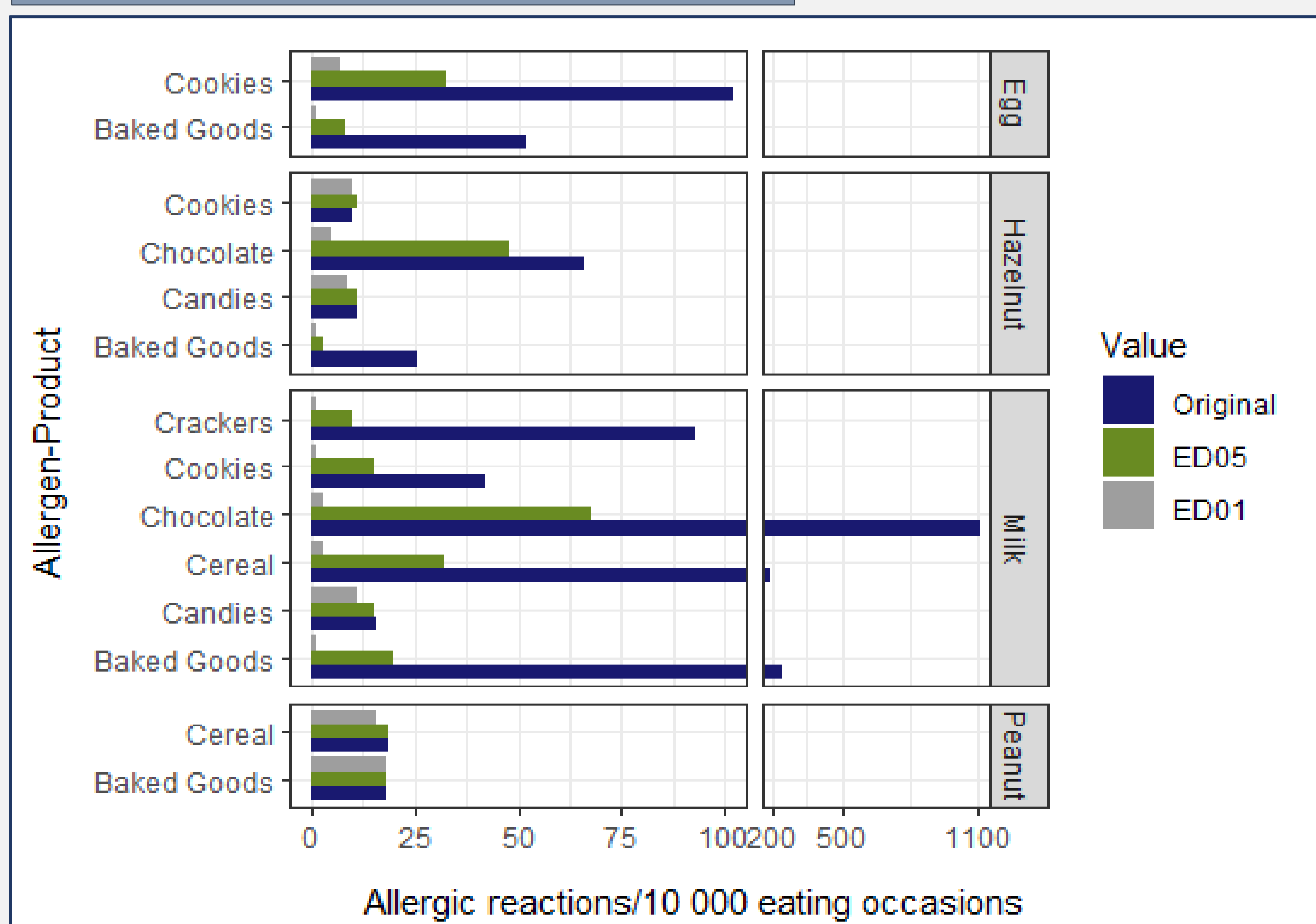


Figure 2: Mean number of allergic reactions per 10 000 eating occasions of products with egg, hazelnut, milk, and peanut PAL, before and after using eliciting doses as thresholds for PAL application

Discussion and Conclusions

- Most prepackaged product-allergen combinations investigated are low risk (<10 allergic reactions/10 000 eating occasions)
- Milk allergen contamination is the greatest in terms of allergic reactions and the array of products affected
- The use of ED01 and ED05 as a threshold for the use of PAL does not diminish the number of allergic reactions when there is minimal contamination (i.e., Hazelnut: baking mix), suggesting cross-contact is adequately managed by food manufacturers and PAL is applied based on a risk assessment
- The use of ED01 and ED05 as a threshold for the use of PAL could diminish the number of allergic reactions that occurs after consumption only when there is severe contamination (i.e., Milk: baked goods)
- The use ED01 and ED05 as a threshold is a potential way of reducing the amount of PAL used on prepackaged products, even when there is no important reduction in the amount of allergic reaction caused

Material and Methods

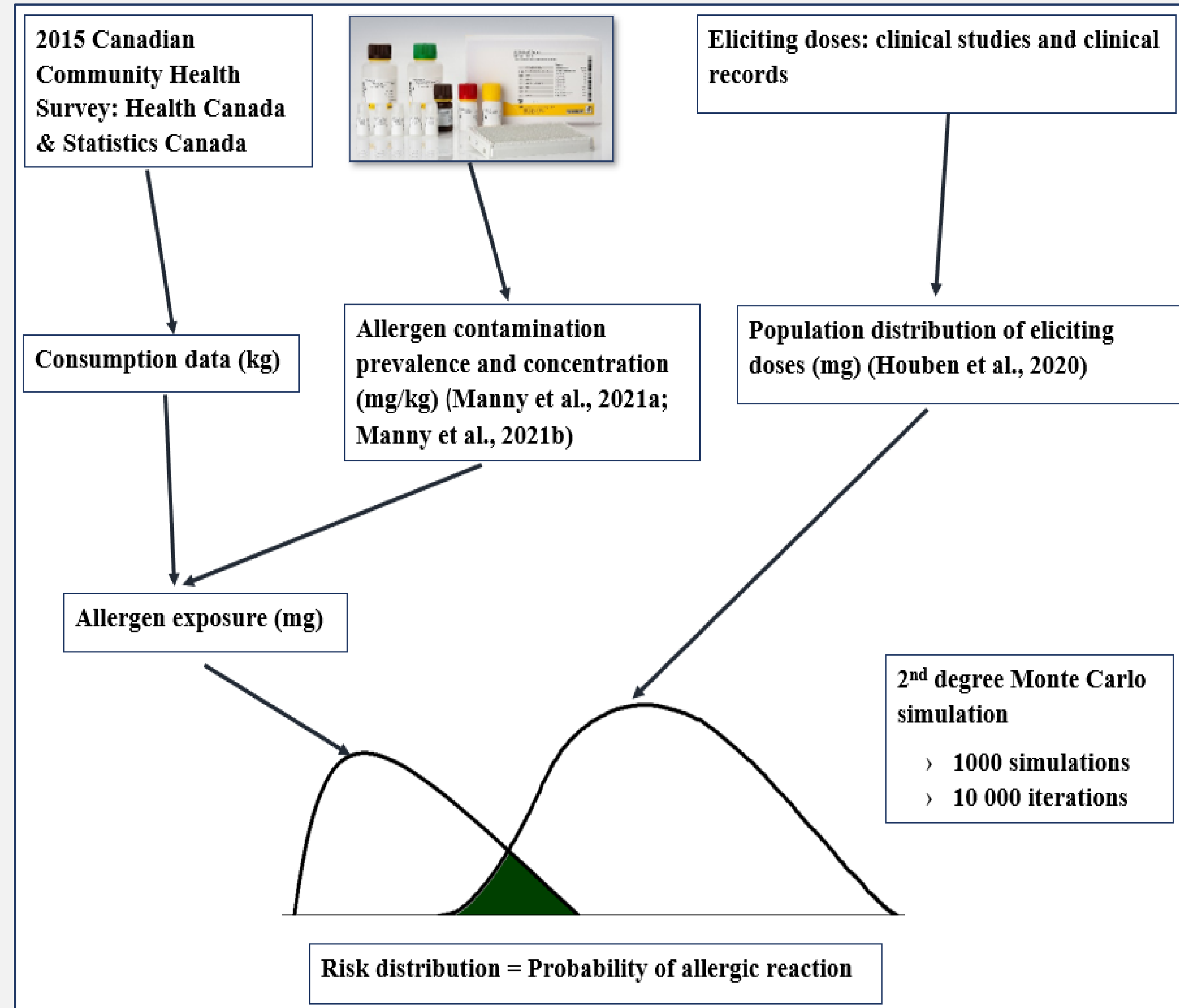


Figure 1: Probabilistic risk assessment and data sources applied to allergens in prepackaged products with PAL sold in Canada

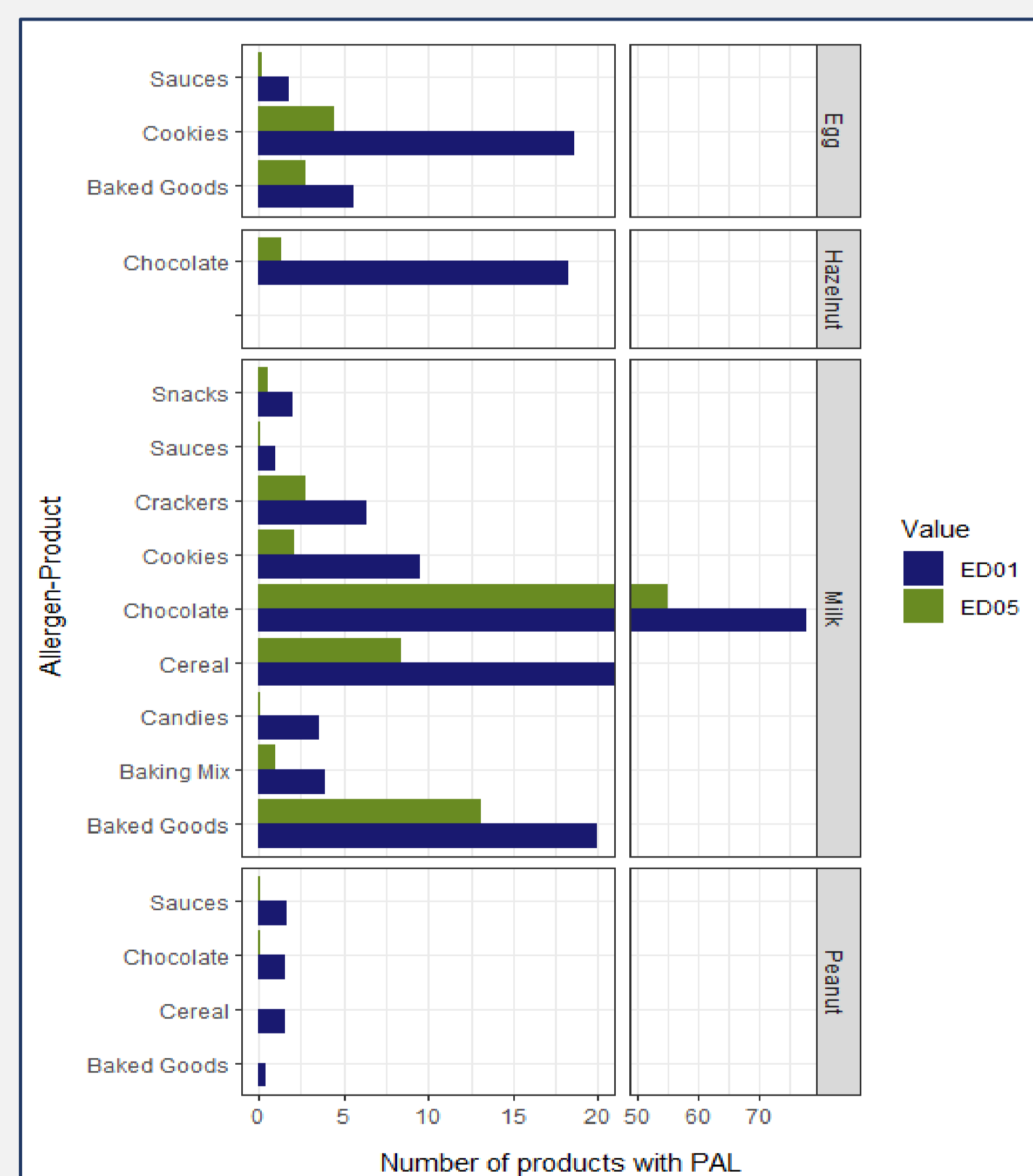


Figure 3: Percentage of products that would use egg, hazelnut, milk, and peanut PAL if eliciting doses are used as a threshold for PAL application, where initial/original allergen concentration and prevalence data, all having PAL, represent 100%

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Literature cited

I. Allen, K. J., & Taylor, S. L. (2018). The Consequences of Precautionary Allergen Labeling: Safe Haven or Unjustifiable Burden? *Manny, E., La Vieille, S., Barrere, V., Theolier, J., & Godefroy, S. B. (2021). Occurrence of milk and egg allergens in foodstuffs in Canada* Manny, E., La Vieille, S., Barrere, V., Theolier, J., & Godefroy, S. B. (2021). Peanut and hazelnut occurrence as allergens in foodstuffs with precautionary allergen labeling in Canada Houben, G. F., Baumert, J. L., Blom, W. M., Kruizinga, A. G., Meima, M. Y., Remington, B. C., Wheeler, M. W., Westerhout, J., & Taylor, S. L. (2020). Full range of population Eliciting Dose values for 14 priority allergenic foods and recommendations for use in risk characterization. *Food and Chemical Toxicology, 146*, 111831. Rimbaud, L., Heraud, F., La Vieille, S., Leblanc, J.-C., & Crépet, A. (2010, November 1). *Quantitative Risk Assessment Relating to Adventitious Presence of Allergens in Food: A Probabilistic Model Applied to Peanut in Chocolate*



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