

Relative Risk of Peanut Allergy across the Globe; Where Toxicology Meets Immunology

HERMAN GIBB¹, BRECHT DEVLEESSCHAUWER²⁻⁵, P. MICHAEL BOLGER⁶, JANINE EZENDAM⁷, JULIE CLIFF⁸, MARCO ZEILMAKER⁷, PHILIPPE JEAN-PAUL VERGER⁹, JOHN PITT¹⁰, JANIS BAINES¹¹, GABRIEL ADEGOKE¹², REZA AFSHARI^{13,14,*}, YAN LIU¹⁵, BAS BOKKERS⁷, HENK VAN LOVEREN⁷, MARCEL MENGELERS⁷, ESTHER BRANDON⁷, ARIE HENDRIK HAVELAAR^{5,7,16}, DAVID C. BELLINGER¹⁷, ANGELA RANDALL¹⁴, MAHMOUD MAHMOUDI¹⁸

¹ Gibb Epidemiology Consulting LLC, Arlington, VA, USA

² Department of Virology, Parasitology and Immunology, Ghent University, Merelbeke, Belgium

³ Institute of Health and Society (IRSS), Université catholique de Louvain, Brussels, Belgium

⁴ Department of Biomedical Sciences, Institute of Tropical Medicine, Antwerp, Belgium

⁵ Institute for Risk Assessment Sciences, Utrecht University, Utrecht, Netherlands

⁶ Exponent, Center for Chemical Regulation and Food Safety, Washington, DC, USA

⁷ National Institute for Public Health and the Environment (RIVM), Bilthoven, Netherlands

⁸ Faculdade de Medicina, Universidade Eduardo Mondlane, Maputo, Mozambique

⁹ Department of Food Safety and Zoonoses, World Health Organization, Geneva, Switzerland

¹⁰ CSIRO Food and Nutrition Flagship, North Ryde, Australia

¹¹ Food Data Analysis Section, Food Standards Australia New Zealand, Canberra, Australia

¹² Department of Food Technology, University of Ibadan, Ibadan, Nigeria

¹³ Environmental Health Services, British Columbia Centre for Disease Control, BC, Canada

¹⁴ Occupational and Environmental Health Division, School of Population and Public Health, University of British Columbia, BC, Canada

¹⁵ INTERTEK, Oak Brook, IL, USA

¹⁶ Emerging Pathogens Institute and Animal Sciences Department, University of Florida, Gainesville, FL, USA

¹⁷ Boston Children's Hospital, Harvard Medical School, Boston, MA, USA

¹⁸ Immunology Research Center, Mashhad University of Medical Science, Mashhad, Iran

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In December 2015, the World Health Organization (WHO) published the first ever report on the estimates of the global burden of foodborne diseases, which included diseases related to chemical exposures in foods such as peanut allergy (1,2). In the report, the burden of disease related to peanut allergies was measured for the European, American and West Pacific Regions (1). The report showed that unlike other food-related chemical exposures, peanut allergies (presented as red in the figure 1) are far more common in the European and American Regions than in the West Pacific Region.

The authors reported the global median (95% uncertainty interval [UI]) number of foodborne illnesses, deaths and disability-adjusted life year (DALYs) related to peanut allergies in 2010 are 107,167 (6,262-210,093), 28 (2-56), 99,717 (5,827-195,489), respectively (1,2). The incidence of clinical peanut allergy and the number of deaths due to peanut allergies in children in Western countries was reported to be 0 to 22.6 per 100,000 and 0 to 0.006 deaths per 100,000 person-years, respectively. Peanut allergy incidence was estimated using prevalence data, assuming that the allergy occurs early in life (< 5 years of age) and persists throughout the individual's lifetime (1). The disability weight for

clinically relevant peanut allergy was estimated to be 0.012, using weighted averages accounting for the distribution of severity (mild (52%), moderate (42%) and severe (6%) symptoms)(1). The gender distribution was assumed to be equal (1).

Although the burden of disease related to peanut allergy was estimated for three WHO regions, the authors were unable to do so for all regions as they did for other foodborne chemical exposures (aflatoxin, dioxin and cyanide in cassava), mainly due to uncertainty and a lack of available information (3). Arguably, the lack of available information in certain regions could indicate that peanut allergies are simply under-reported. However, it could also indicate that peanut allergies are rare in these regions, an idea that has been conveyed in the literature (4). For example, there is a common perception amongst clinicians that peanut allergies are rare in Asia (4). The reported prevalence of peanut allergies in Asia is much lower than that reported in Western countries; whereas many other allergies (milk, egg and shellfish) are far more common (4,5).

In the United States, where peanut allergies are more common and the prevalence seems to be increasing in

*Correspondence to: Reza Afshari; MD, MPH, PhD. Environmental Health Services, BC Centre for Disease Control, 655 West 12th Avenue, Vancouver, BC V5Z 4R4 & Occupational and Environmental Health Division, University of British Columbia, Vancouver, Canada.

Tel: +1 604 707 2462, E-mail: Reza.Afshari@bccdc.ca

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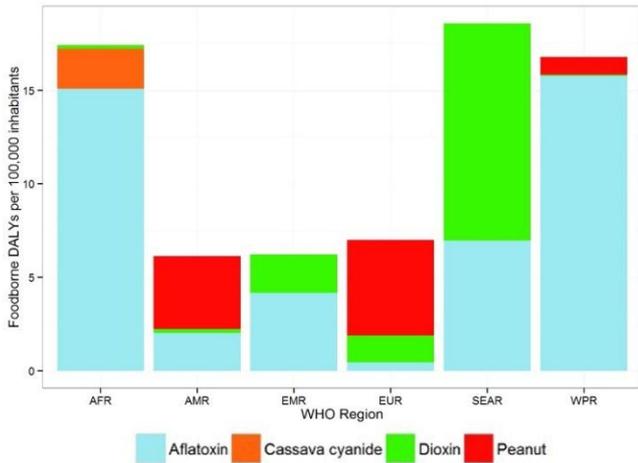


Figure 1. The relative contribution to the DALY incidence by each of four chemicals for each of the WHO regions (adopted from Gibb et al 2015 (1)).

AFR: African Region, AMR: Region of Americas, EMR: Eastern Mediterranean Region, EUR: European Region, SEAR: South East Asian Region and WPR: Western Pacific Region

children (6), several potential hypotheses have been proposed: modern lifestyle, the explosion of new diseases, the dual allergen exposure hypothesis, the vitamin D hypothesis, the hygiene hypothesis, interactions between genetics and the environment, early life introduction of peanut might lead to oral tolerance and protect against peanut sensitization, potential sensitization to peanuts through the skin (7-11). The genetic hypothesis, in particular, could explain the observed geographical difference in peanut allergy prevalence around the world, and it is plausible to conclude that peanut allergies may be race dependent.

Current knowledge gap and implications

We hope this commentary can inform physicians and public health workers, and can raise awareness about peanut allergies to facilitate future discussions. Although the WHO report on the estimates of the global burden of foodborne diseases indicates a possible geographical difference in global peanut allergy prevalence, further studies need to compare the relative risk of peanut allergies among individuals of different racial backgrounds in one defined population. This will help to determine if peanut allergies are truly “race dependent”, which would have important implications for multi-racial populations such as Canada. Relative resistance of Asian populations to peanut allergies could be a starting point for further research on etiology of other allergies. Ultimately, the main goal would be to develop population level peanut allergy prevention strategies for multi-racial populations.

Conflict of interest:

HJG, BD, MPB, AHH, JB, PV, JIP, GA, RA, and DCB serve as members of the WHO Foodborne Disease Burden Epidemiology Reference Group without remuneration. DCB is a member of the WHO Expert Advisory Panel on Food Safety. All authors declare no competing interests.

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