

Exposure to bisphenols as a risk factor for the development of allergic diseases and asthma in children

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INTRODUCTION

- Bisphenols are a group of chemical compounds used mainly for the production of plastics, resins and thermal paper.
- The European Chemicals Agency (ECHA) has placed BPA on the Candidate List of substances of very High concern because of its endocrine disrupting properties.
- The general population is exposed to bisphenols in daily life, and the digestive tract is the main source of exposure to bisphenols
- BPA has been classified as an endocrine disruptor (EDCs). As in the case of other EDCs, children (mainly during fetal life and childhood) are a population particularly sensitive to the effects of the above mentioned compounds.
- BPA, BPS and BPF have been placed by the European Union on the list of priority substances to be identified in human biomonitoring studies
- Studies suggest that exposure to BPA in both fetal and postnatal life may negatively affect lung function and increase the risk of wheezing and asthma in early childhood and early school age, although the results are not fully conclusive

MATERIALS AND METHODS:

- The analyzes are based on data and biological material from the Polish Mother-Child cohort (REPRO_PL). The research is carried out under the OPUS grant of the NCN.
 - The study population consists of 400 children aged 7 years who participated in the third phase of the REPRO_PL cohort
 - Under phase IV of REPRO_PL adolescents aged 14-15 years and their mother are invited to the examination to the Department of Pediatrics and Allergy of the Medical University of Lodz.
- Criteria for inclusion in the study*
- Children of both sexes aged 14-15 years who participated in earlier stages of the REPRO_PL study.
- Exclusion criteria from the study*
- anatomical and functional anomalies in the upper and lower respiratory tract,
 - chronic diseases affecting the functioning of the respiratory system, including cystic fibrosis, diabetes,
 - cancer and humoral or cellular immunodeficiency,
 - chronic systemic glucocorticosteroids,
 - lack of cooperation during the research.

AIM OF THE STUDY

- Assessment of exposure to bisphenol A (BPA), bisphenol F (BPF), bisphenol S (BPS) and selected socio-demographic and lifestyle factors determining exposure of early school and adolescent children in Poland
- Evaluation of the impact of exposure to BPA, BPF, BPS on the development of asthma and allergies in early childhood and adolescence
- Assessment of gender-specific relationship between bisphenol exposure and development of asthma and allergies in children

RESULTS AND ACHIEVEMENTS:

- A database was prepared for early school age analyses (data collected as part of Phase III of REPRO_PL). Preliminary analyses were performed on the assessment of exposure to bisphenols and the determinants of exposure for children aged 7 years old
- Approval was obtained from the Bioethics Committee for Phase IV of REPRO_PL
- A paper describing the methodology of the Phase IV REPRO_PL study was published - "REPRO_PL- Polish Mother and Child Cohort - Exposure, Health Status, and Neurobehavioral Assessments in Adolescents - Design and Cohort Update" IJERPH 2022;19(21):14167
- A review paper "Bisphenols exposure and allergic diseases" was prepared - the paper is under review in International Journal of Occupational Medicine and Environmental Health
- As part of phase IV of REPRO_PL, 43 children aged 14-15 years were included in the study based on inclusion and exclusion criteria. Consent was obtained for participation in the study from the study's caregivers/participants.
- Each child underwent a medical examination, morning urine samples were collected and are stored in -800C until the shipment to the Bochum Institute, skin prick tests, spirometry and measurement of the concentration of nitric oxide in the exhaled air were performed. Participants and their mothers were asked to fill in the prepared questionnaires.
- A database was created containing the results of medical examinations, functional tests, skin prick tests, the results of completed surveys. A analysis of the concentration of bisphenol in urine remains under development

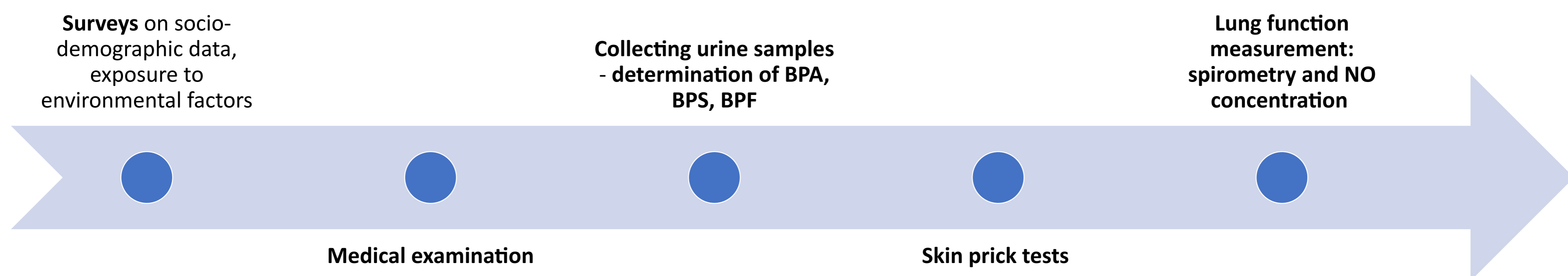
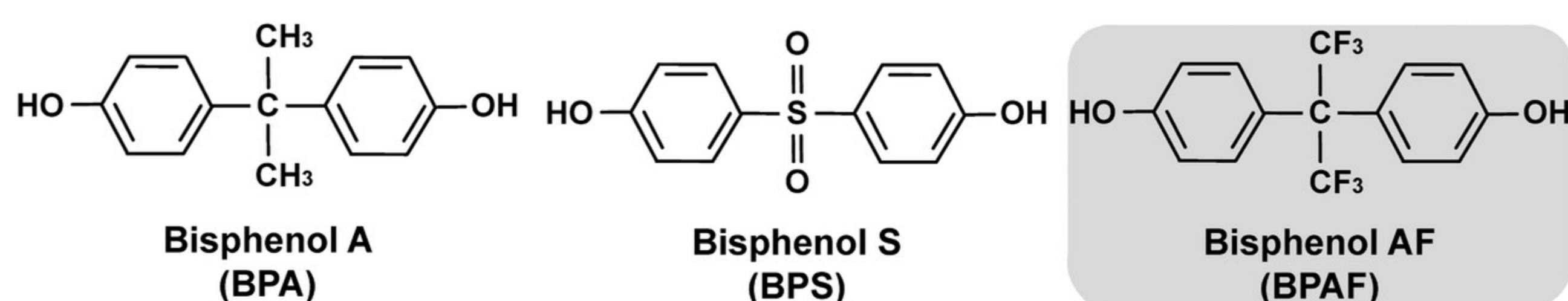


Fig. 1. Elements of the study performed as part of a one-time visit to the Department of Pediatrics and Allergy of the Medical University of Lodz



Source: https://www.researchgate.net/figure/Chemical-Structures-of-4-Bisphenols-BPA-BPB-BPS-and-BPAF-Used-in-This-Study_fig5_320748938