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April 16, 2021

**Comments submitted for the National Toxicology Program, April 23, 2021,
Board of Scientific Counselors meeting**

The Environmental Working Group, a nonprofit research and policy organization with offices in Washington, D.C., Minneapolis, San Francisco and Sacramento, Calif., urges the Board of Scientific Counselors of the National Toxicology Program (NTP) to include the exposures of professional and domestic cleaning workers, janitors and people who clean as part of their job duties in the Occupational and Inhalation Exposure Program, as well as consider unique exposures and susceptibility of children to cleaning products and asbestos-containing cosmetics.

EWG supports the current outline of NTP's Occupational and Inhalation Exposure Program and also has several recommendations that should be considered broadly throughout the program and in all of the objectives. Such recommendations include that the program broaden its investigation of chemicals that can cause respiratory harm to include exposures to professional and domestic cleaning workers; consider the unique vulnerability of children in its assessment of respiratory hazards; and consider children's unique exposure to certain chemicals, such as cleaning products and asbestos in talc-based cosmetics.

1. Professional cleaners experience respiratory harm from occupational exposures not covered by NIOSH

Several epidemiological studies have identified professional cleaners at increased risk for multiple adverse respiratory outcomes, including chronic obstructive pulmonary disease (COPD), asthma and other asthma-like symptoms and lung function decline. Most recently, a systematic review and meta-analysis concluded that professional cleaners are at a 50 percent increased risk of developing asthma and 43 percent increased risk of developing COPD.¹ Importantly, professional cleaners who do not work for large companies or who clean residential homes fall outside of NIOSH and OSHA guidelines and may not receive proper hazard communication about their professions. It is important that NTP evaluate exposure across demographic groups with respect to cleaning product use and differential exposure that may occur from using different product types.² Given

¹ Archangelidi O, Sathiyajit S, Consonni D, Jarvis D, De Matteis S. Cleaning products and respiratory health outcomes in occupational cleaners: a systematic review and meta-analysis. *Occup Environ Med.* 2020 Nov 24; oemed-2020-106776. doi: 10.1136/oemed-2020-106776

² Isaacs K and Stanfield Z. Mining Potential Chemical Co-exposures from Consumer Product Purchasing and Ingredient. Center for Computational Toxicology and Exposure, US-EPA, RTP, NC Data. January 2021. Available at: <https://ntp.niehs.nih.gov/iccvam/meetings/commprac-2021/20210126-iccvam-cop-isaacs-508.pdf>



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the documented health harms experienced by this group, it is essential that NTP consider people who clean for a living or whose job duties include cleaning throughout the objectives of the Occupational and Inhalation Exposure Program.

2. Chemicals in cleaning products that can cause respiratory harm are not fully known

Despite the established link between the use of cleaning products and respiratory harms, the list of chemicals that cause such harms is not fully known for several reasons: 1) though the landscape is noticeably improving, there continues to be poor disclosure of ingredients used in both professional and consumer cleaning products 2) few epidemiological studies measure chemical exposure of individuals, either via headspace gas chromatography or through biological matrix sampling such as urine or blood 3) the molecular mechanisms associated with respiratory harm are not fully characterized 4) and the widespread use of essential oils and terpenes, such as citrus-based cleaning products, can contribute to secondary aerosol pollutants and affect health.³

To address these issues, EWG supports NTP's current focus on alpha-pinene and related monoterpenes, PFAS, alkylbenzenes and mixed xylenes, as mentioned in objectives 1 and 3. Objective 1 is "Assess the human health hazard potential of current and emerging airborne substances of concern to the general population and in the workplace using a tailored combination of traditional and alternative experimental approaches to address substance-specific key data needs." Objective 3 is "Enhance the human translational relevance of in vivo and in vitro experimental models for evaluating airborne exposures via the application of novel tools and refinement of traditional approaches."

To further and more comprehensively address these objectives, EWG recommends NTP broaden the scope of chemicals investigated in its assessments to better cover the totality of chemical exposures from cleaning products in occupational and general settings, with a particular emphasis on disinfectants such as quaternary ammonium compounds and other nitrogen-containing surfactants, sodium hypochlorite, glycol ethers and fragrance chemicals, including essential oils, as well as mixtures of chemicals used in common household cleaning product formulations, all of which have been associated with asthma or other adverse respiratory outcomes. Furthermore, terpenes have been associated with secondary aerosol formation and reduced indoor air

³ Milhlem SA, Verrielle M, Nicolas M, Thevenet F. Does the ubiquitous use of essential oil-based products promote indoor air quality? A critical literature review. Environ Sci Pollut Res Int. 2020 May;27(13):14365-14411.



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quality, an important aspect of terpene toxicity that should be incorporated into NTP assessments.⁴

3. Early life exposure to cleaning products can affect the development of asthma in children

Inhalation exposures during pregnancy and early life may affect respiratory disease development later in life. Evidence from a longitudinal birth cohort in Canada suggests that exposure to cleaning products at three to four months of age is associated with an increased risk of wheeze and asthma diagnosis at three years of age.⁵ Asthma in children is a growing public health concern, and identifying environmental risk factors for asthma development in children is a critical public health need. To address this issue, EWG recommends that NTP, to the best of its ability, incorporate considerations of early life susceptibility into its in vitro and in vivo experiments, as described in Objective 3, stated above, and Objective 2, “Predict adverse human health effects to the airways and lungs and generate mechanistic data to support human health risk assessments through the evaluation and utilization of human-relevant microphysiological systems.”

This may include assays on the developing lung or differentiating stem cells as well as early life dosing paradigms in animal studies.

4. Asbestos in talc-based cosmetics products presents a unique inhalation exposure risk for children

As the program currently stands, there are several stakeholders that focus on the issue of asbestos inhalation and occupational exposures. Asbestos is a well-characterized and well-recognized human carcinogen, and early life exposures to asbestos have also been associated with the development of mesothelioma later in life.⁶ Recent EWG investigations identified three of 21 cosmetics products tested as containing tremolite asbestos, including two eye shadow palettes and one make up kit marketed to children.⁷ The potential for childhood exposure to asbestos through talc-based cosmetics is concerning and should be considered in NTP’s asbestos assessments.

⁴ Coleman BK, Lunden MM, Destaillats H, Nazaroff WW. Secondary organic aerosol from ozone-initiated reactions with terpene-rich household products. *Atmospheric Environment*. November 2008; 42: 35: 8234-8245.

⁵ Parks J, McCandless L, Dharma C, Brook J, Turvey SE, Mundhane P et al. Association of use of cleaning products with respiratory health in a Canadian birth cohort. *CMAJ*. 2020 Feb 18;192(7):E154-E161. doi: 10.1503/cmaj.190819.

⁶ Dalsgaard SB, Wurtz ET, Hansen J, Roe OD, Omland O. Environmental asbestos exposure in childhood and risk of mesothelioma later in life: a long-term follow-up register-based cohort study. *Occup Environ Med*. 2019 Jun;76(6):407-413. doi: 10.1136/oemed-2018-105392.

⁷ Stoiber T, Fitzgerald S, Leiba NS. Asbestos Contamination in Talc-Based Cosmetics: An Invisible Cancer Risk. *Environmental Health Insights*. Nov 2020; 14: 1178630220976558.



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Additionally, although EWG supports preventing respiratory harm and cancer from asbestos exposures, we also support a broader and more diversified stakeholder engagement and exposure portfolio for the NTP program, in order to better characterize the extent of inhalation exposure relevant to public health, as described in Objective 2.

EWG greatly appreciates the opportunity to comment and the extremely valuable work of the National Toxicology Program in advancing environmental and public health research.

Submitted on behalf of the Environmental Working Group,

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