

AAN 77th ANNUAL MEETING ABSTRACT

Media Contacts:

Renee Tessman, rtessman@aan.com, (612) 928-6137

Natalie Conrad, nconrad@aan.com, (612) 283-5484

EMBARGOED FOR RELEASE UNTIL 4 P.M. ET, TUESDAY, FEBRUARY 25, 2025

Abstract Title: Marine Microplastics Levels and the Prevalence of Neurologic Disability

Press Release Title: Microplastics in ocean linked to disabilities for coastal residents
Mobility, self-care, independent living disability higher in areas with high microplastics

Authors: Brinda Desai¹, Bhargav Makwana¹, Jayashri Srinivasan¹, Diana Apetaurova¹, Sourbha Dani¹, Siddharth Sehgal¹, Oleg Yerstein¹, Sumanth Khadke¹, Ashish Kumar², Khurram Nasir³, Rishi Wadhwa⁴, Yixin Kong¹, Ana Navas-Acien⁶, Gary Adamkiewicz⁵, Sanjay Rajagopalan⁷, Sadeer Al-Kindi⁸, Susan Moffatt-Bruce¹, Sarju Ganatra¹
¹Lahey Hospital & Medical Center, ²Department of Medicine, Cleveland Clinic, Akron General, ³Houston Methodist DeBakey Heart & Vascular Center, ⁴Department of Health Policy and Management, ⁵Department of Environmental Health, Harvard T.H. Chan School of Public Health, ⁶Department of Environmental Health Sciences, Columbia University Mailman School of Public Health, ⁷Harrington Heart and Vascular Institute, University Hospitals Cleveland Medical Center, ⁸Center for Health and Nature and Department of Cardiology, Houston Methodist Hospital

Objective: To investigate the correlation between marine microplastic levels in ocean water and the prevalence of cognitive, mobility, self-care, and independent living-associated disabilities in adjacent coastal counties.

Background: Micro- and nanoplastics (MNPs) are recognized as emerging risk factors contributing to cognitive decline. However, the association between population-level marine microplastic levels (MMLs) and the prevalence of disabilities related to cognition, mobility, self-care, and independent living remains poorly understood. The study aims to investigate this association, exploring various proposed mechanisms for MNPs' impact on brain health and bridging the gap between environmental microplastic pollution and neurological disabilities.

Design/Methods: In this cross-sectional study comprising 218 coastal counties in the United States, we compared the prevalence of cognitive disability, mobility disability, self-care disability, and independent living disability in counties with very high and low MMLs. Unadjusted and adjusted prevalence ratios (PRs) were computed using population-weighted quasi-Poisson regression across three different models to examine the relationship between disability prevalence and MMLs.

Results: The mean prevalence of cognitive, mobility, self-care, and independent living disability was significantly higher in counties with very high MMLs (15.2%, 14.1%, 4.2% and 8.5%, respectively) compared to low MMLs (13.9%, 12.3%, 3.6% and 7.7%, respectively, $p < 0.001$). After adjusting for potential confounders, counties with very high MMLs showed significantly higher adjusted prevalence rate (PR) of cognitive (PR: 1.09 [1.06, 1.12], $p < 0.001$), mobility (PR: 1.06 [1.03, 1.10], $p < 0.001$), self-care (PR: 1.16 [1.11, 1.20], $p < 0.001$), and independent living disability (PR: 1.08 [1.05, 1.12], $p < 0.001$) compared to those with low MMLs.

Conclusions: Our findings indicate a significant association between marine microplastic levels and the prevalence of cognitive, mobility, self-care, and independent living disabilities in the US coastal counties. Further research is warranted to explore the potential public health implications of microplastic pollution.