

Microplastics Occurrence, Health Effects, and Mitigation Policies:
An Evidence Review for the California Legislature

Appendix A. Microplastics Rapid Review Protocol

This publicly available protocol outlines the process for this rapid systematic review. Developing a protocol prior to initiating a review is an important step in a systematic review as it increases transparency in the methods used and reduces the potential for bias.

The full protocol is available on Open Science Framework website at <https://osf.io/cwu87>.

Microplastics Rapid Review Protocol Abstract

Background: Microplastics (MPs) are a growing environmental contaminant for which there are documented human exposures. Although there is recognition of this emerging threat, there is a paucity of epidemiological research evaluating the relationship between MP exposure and human health outcomes. Furthermore, to the best of our knowledge, there are no rigorous systematic reviews on this topic.

Objective: To conduct a rapid systematic review to evaluate the relationship between MP exposure and adverse human health outcomes.

Search and study eligibility: We will search PubMed, Embase, ProQuest, and Web of Science for human epidemiological or animal toxicological studies evaluating the human health effects of exposure to MPs. We will include primary research studies of any design that quantitatively examine the association of MP exposure and any human health outcomes. Studies will be included if they meet our pre-defined eligibility criteria.

Study appraisal, data analysis and synthesis: We will evaluate risk of bias for each study included in our review. If data are sufficiently homogenous, we will conduct a meta-analysis or other quantitative synthesis of the evidence across studies for each evidence stream. Upon completion of the data analysis, we will rate the quality and strength of the evidence separately for each stream of evidence. Finally, we will integrate the human and animal evidence streams to produce a final bottom-line statement regarding the implications for human toxicity to MPs based on the totality of evidence collected and evaluated in the review.

Conclusion: This work has important implications for research and policy. Results from the rapid review will expand the existing body of evidence exploring adverse human health effects from MP exposure and hold potential to inform both state and federal decision-making on MPs.