

Development of MNP Health & Environmental Literature Platform (MNP-HELP):

A Curated Literature Repository for Risk Assessment Research

Julie Panko, ToxStrategies LLC

June 12, 2023

ToxStrategies

Overview of Project



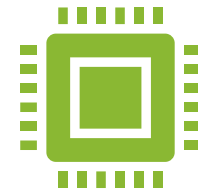
Develop

Develop a searchable, user-friendly database of MNP literature and associated meta-data that is relevant to human health and ecological risk assessment



Reduce

Reduce need for researchers to independently track and review published literature



Streamline

Streamline literature reviews and data gathering for existing and new R&D efforts.

Project outline



Task 1. Project planning & protocol development



Task 2. Search implementation & screening



Task 3. Development of guidance & best practices



Task 4. Web database development



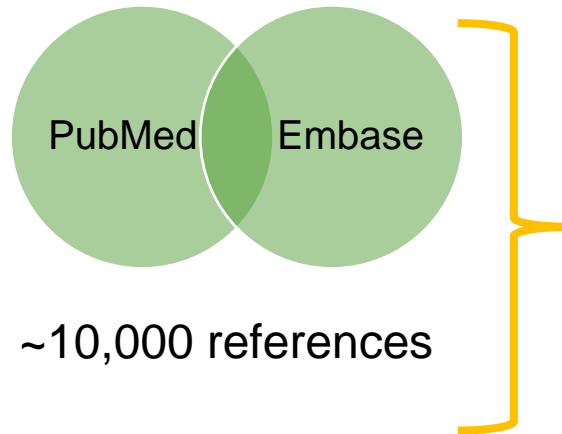
Task 5. Database maintenance plan

Protocol elements

- Context and Background
- Methods
 - Reference identification
 - Inclusion/exclusion criteria
 - Categorization
 - Piloting and Reviewer Calibration



Search & screening process

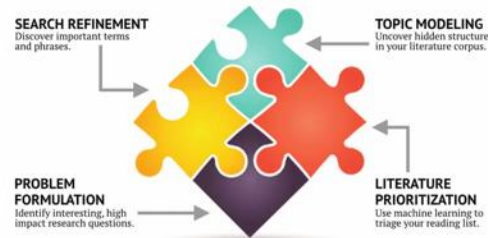


- Validate success of search syntax with known key references

SWIFT REVIEW

SWIFT-Review (SWIFT is an acronym for "Sciome Workbench for Interactive computer-Facilitated Text mining") is a freely available interactive workbench which provides numerous tools to assist with problem formulation and literature prioritization. SWIFT-Review puts the systematic review expert in the driver's seat by providing several features that can be used to search, categorize, and prioritize large (or small) bodies of literature in an interactive manner. SWIFT-Review utilizes newly developed statistical text mining and machine learning methods that allow users to uncover over-represented topics within the literature corpus and to rank order documents for manual screening.

For more information about SWIFT-Review, and other Sciome products and services please contact us at swift-review@sciome.com.



- Overall sense of landscape
- Topic modeling
- Identification of papers for DistillerSR AI training
- Validate with known key references





- Initial include/exclude using AI re-rank and AI screen
- Develop Classifiers for categorization as project progresses
- Train with known key references

Inclusion/Exclusion Criteria at the Title and Abstract Level

	Include	Exclude
Population	<ul style="list-style-type: none"> • Any 	<ul style="list-style-type: none"> • No exclusions
Exposure	<ul style="list-style-type: none"> • Micro- or nano-plastics • Any exposure routes or media • Quantitative measurement or estimation informed by a measurement 	<ul style="list-style-type: none"> • No micro or nano-plastics • No quantification of exposure • Inadequate exposure data for quantitative characterization of exposure-response relationship
Outcomes	<ul style="list-style-type: none"> • Any adverse health outcomes • Mechanistic outcomes • Biomonitoring data • Exposure data • Fate and transport data 	<ul style="list-style-type: none"> • Mitigation only papers (treatment, cleanup, etc.)
Reference type	<ul style="list-style-type: none"> • Primary studies • Systematic Reviews • Narrative reviews tagged but not further categorized 	<ul style="list-style-type: none"> • Opinion pieces • Commentaries • Letters to the editor
Study model/ design	<ul style="list-style-type: none"> • <i>In vitro</i> study designs • <i>In vivo</i> study designs • Epidemiological studies • Biomonitoring studies • Ecological studies • Fate and transport studies 	<ul style="list-style-type: none"> • Case studies or case series
Additional criteria		<ul style="list-style-type: none"> • Abstract in foreign language

What studies should be included?



Reference Details 

RefID: 1536, Altered gene expression in *Chironomus riparius* (insecta) in response to tire rubber and polystyrene microplastics Actions 

Carrasco-Navarro, V., Muñiz-González, A. B., Sorvari, J., Martínez-Guitarte, J. L.

Reference Label(s):

The extent until which plastics are present in our surrounding environment completely exceeds our expectations. Plastic materials in the form of microplastic have been found in terrestrial, freshwater and marine environments and are transported through the atmosphere even to remote locations. However, we are still far from understanding the effects that they may have caused and are causing to biota. In the present study, we investigated the alterations in the expression of twelve genes in the aquatic insect *Chironomus riparius* after 36 h exposures to polystyrene and tire rubber microplastics at nominal concentrations of 1 and 10 mg L⁻¹. The results indicated that several genes encoding for heat shock proteins (hsp90, Glycoprotein 93 (Gp93), hsc70, hsp60, hsp40,

and go to or  

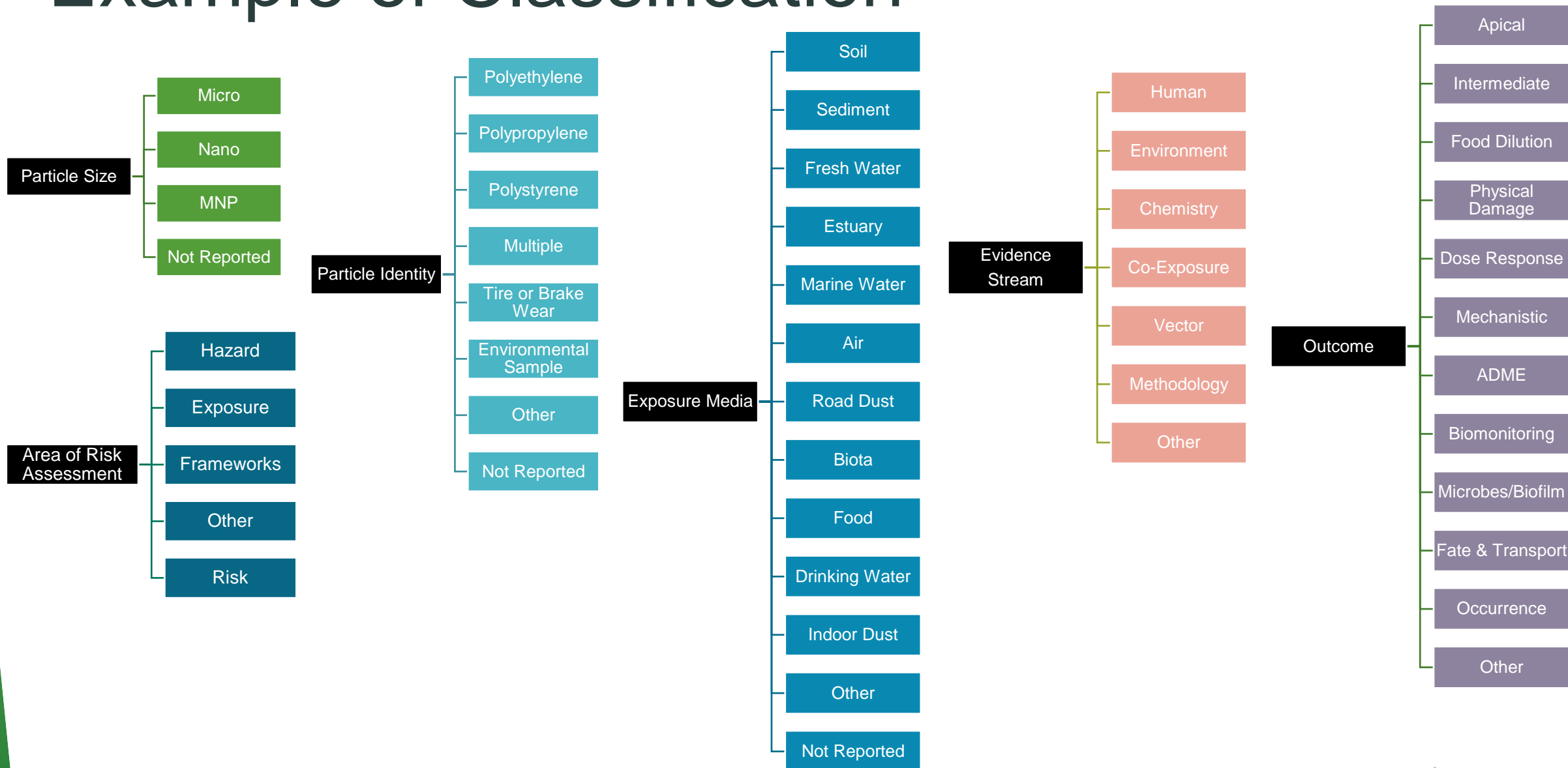
Should this study be included in the database?

- Is it relevant to MNP risk assessment?
- Does it report a specific concentration or dose, or particle characterization or chemistry?

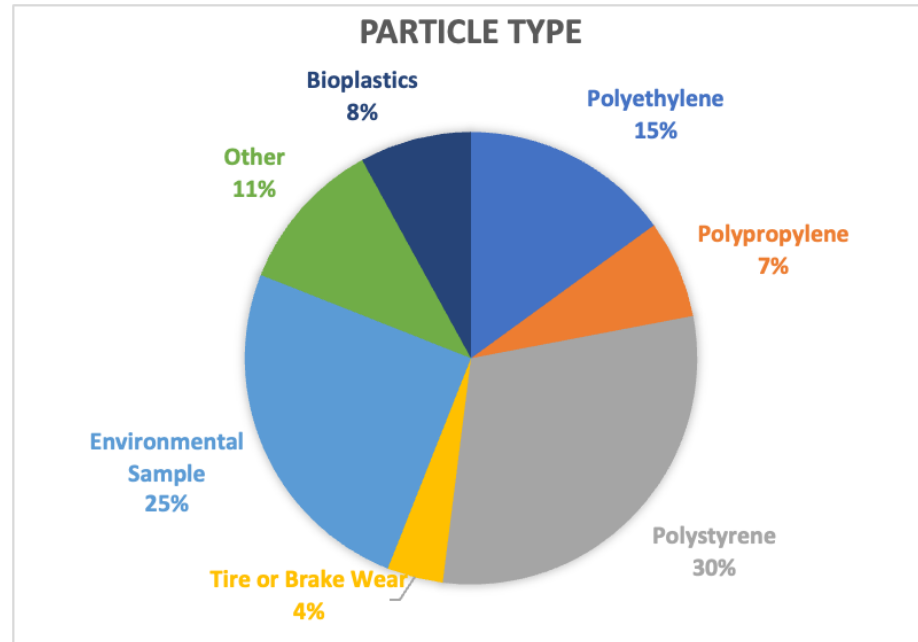
[Clear Response](#)

Particle size:

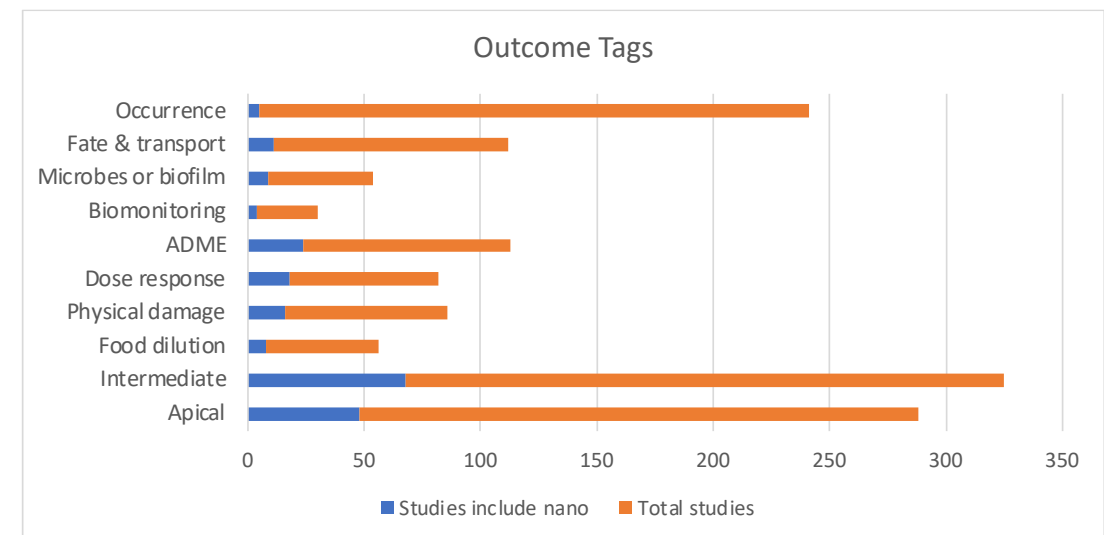
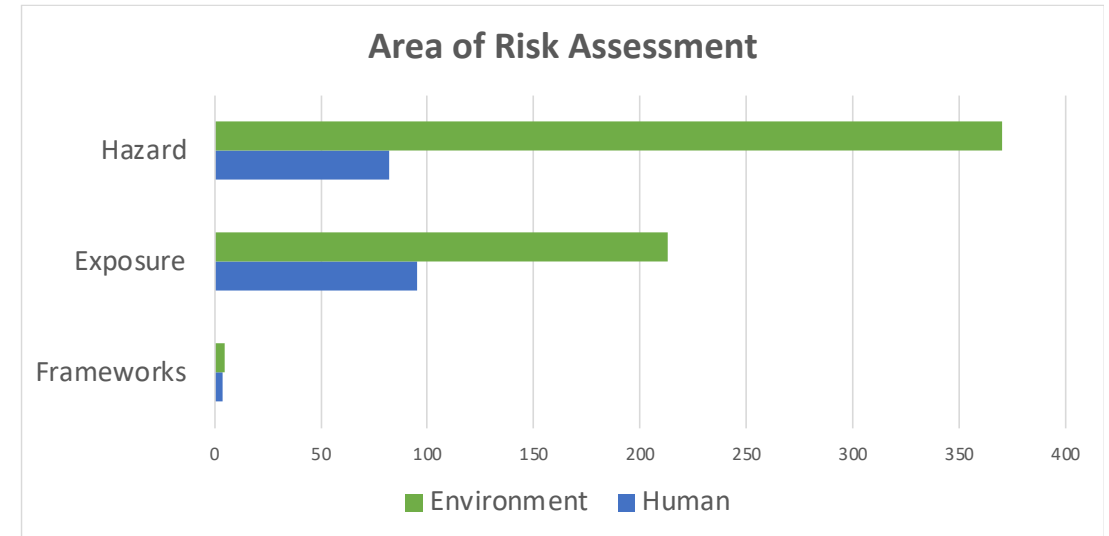
Example of Classification



Data Dashboard Example: Charts



Preliminary results based on initial 1,000 studies reviewed; may not be representative of the full dataset



Next Steps...

- AI training
 - Use the first 1000 papers manually reviewed by scientists to train AI program to recognize and tag the remaining 9000 papers
 - Establish 'yes' or 'no' questions for each category and tag
 - Run AI program
 - QA/QC AI results
- Design database
- Populate database
- Database update plan



Acknowledgments

- This project is funded by the Foundation for Chemistry Research and Initiatives (FCRI)
- Project Team: Kara Franke, Jennifer Bare, Alison Gauthier, Sara Rogers; WeBuild (Web database design)

Questions?

ToxStrategies