

# Breakout Session 3

Health and Environmental impacts

**Q1. There is a broad concern about the occurrence of nanoplastics in the environment and human exposure to nanoplastics through consumer use and in the workplace. Are nanoplastics different from other nanomaterials?**

Yes



No



## Q2: If you answered yes, how are they different?

- Many are incidental and not manufactured making exposure assessment particularly difficult.
- They are byproducts and not manufactured, they are also often inert or have lower “activity”
- More varied in terms of composition, size, shape, etc.

**Q3. There are existing standards and technical reports addressing nanomaterials generally and for some specific nanomaterials. Are these standards applicable to EHS concerns for nanoplastics?**

Yes



No



Not sure



# Q4: If existing standards are not applicable what is missing?

- How do you marry a bunch of simple assays to provide a picture of potential environmental/health responses? Do we know key impacts, initiating events?
- Matrix management
- Standards do not represent what is in the environment along with appropriate and relevant sample prep is important (e.g. to disperse or not disperse)

# Q5: Does any of the terminology already in use for nanomaterials generally not work when applied to nanoplastics?

- The important size ranges are different for health related effects than other areas of nanomaterials
- The origin of the materials (i.e. being engineered compared to degradation of plastics)
- Generalities work sometimes but clarity is needed at the fundamental level (what is a plastic? Does “plastic” refer to what it is or what it was?)

**Q6. Most nanoplastics can be considered as pollutants since they are not intentionally produced. Are standards needed for nanoplastics as wastes?**

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Yes



No



# Q7: Are there examples of sampling/separation needs for nanoplastics for which standards would help?

- Need to look at this at different levels (environment, ecosystem, animal, organ, food) and desired levels of confidence
- There would be benefit to standardizing storage and preparation of different environmental matrices.
- Need to establish detection limits/accuracy of techniques and identification that could be composition and size dependent
- Detection protocols in relevant matrices such as water, indoor dust, sediment, biological tissues
- Weathered plastic standards are needed



## Q8: Are there examples of sampling/separation challenges for nanoplastics for which standards would help?

- Separation of nanoplastics from other carbon containing matter is important. How do you separate what matters? NPs are likely diverse in the environment.
- Comparability of methods established from other nanomaterials will be useful at least as a starting point for nanoplastics.
- Due to the complexity and variability of what could be collected on a day by day basis, sampling size and frequency probably differ from standard collection procedures.

# Q9: Can you identify tools to assess the toxicity of nanoplastics separately from when they function as carriers?

- Need a better understanding of the surface chemistry/interactions with the environment at that size
- Need to address which toxic materials are absorbed to nanoplastics
- NIOSH/Harvard laser printer studies postulate that toxic effects were not due to the nanomaterials/particles but that the nanoparticles were enhancing effects of emitted PAHs.
- There are many nanoplastics why are they special? Which particular ones should we focus on.
- Testing secondary effects such as the function as a carrier is very challenging to do in a standardized way and is usually not performed

# Q10. Should intentionally manufactured nanoplastics be included in H&I studies?

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Yes



No



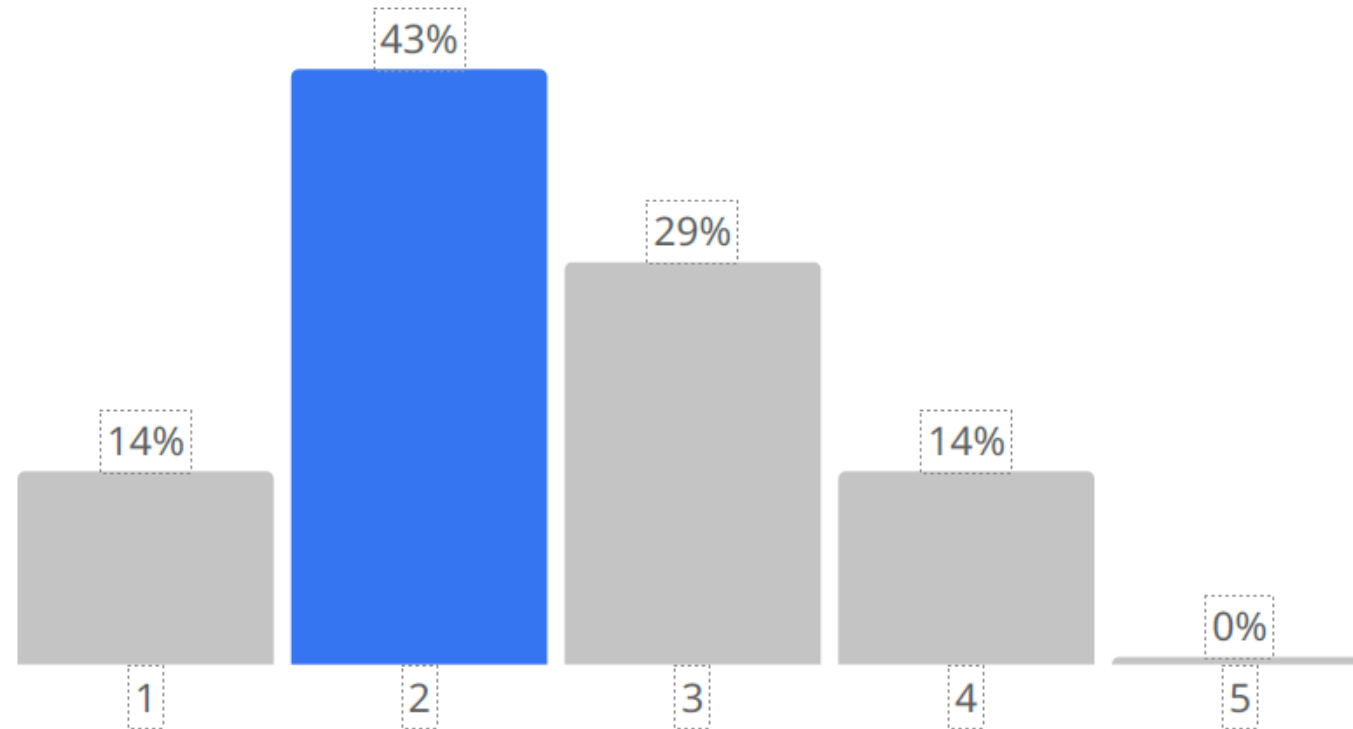
Not sure



**Q11. How significant are non-waste generated nanoplastics?**

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Score: 2.4



# Q12: What are the most important matrices for H&I studies at this time?

- Air, water, surface accumulation
- Food stuffs and human samples (like urine)
- Soil/sediment

# Q13: Despite the data gaps for assessing H&I of all nanoplastics, what do we know about synthetics that could help us prioritize H&I research?

- We can use worker studies (like urethanes and PVC that present specific health effects) to point us towards plastics we should focus on studying at the nano level.
- Synthetics have a poorly soluble paradigm and degradation product profiling could occur depending on the closeness to production.
- We know polymers are complex materials that contain a mix of other chemicals and microorganisms including pathogenic ones.

