

# A summary of international workshops towards a harmonized assessment of the exposure to manufactured nanoobjects

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# Workshops

- Bilthoven, The Netherlands 2009
- Dublin, Ireland 2010
- Zeist, The Netherlands 2010
- Boston, MA, USA 2011

# Some of the Contributors

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# Purpose of Discussions

- Discuss state-of-the-art approaches in sampling and measuring nano objects at workplaces
- Identify common approaches in measurement strategies and **the obstacles**
- Reach consensus where possible and identify knowledge gaps

# Three topics

1. Measurement strategies
2. Analyzing, evaluating, and reporting of exposure data
3. Core information for (exposure) data storage

# Measurement Strategies

- NIOSH presented the Nanoparticle **Emission** Assessment Technique (NEAT).
- German chemical industry presented **a tiered-type approach** geared towards the needs of industrial hygienists in companies.
- Both approaches employ **initial assessments** of the nanomaterial handled and operating conditions, **followed by easy-to-use** measurement devices, like CPC or OPC **graduating** to electron microscopy and more sophisticated instrumentation (SMPS, ELPI)

# 1. Measurement Considerations

- Personal breathing zone/process/area
- Full shift vs task based
- Efficacy of controls vs epidemiologic use
- Occupational exposure limits
- Equipment transport

# Additional measurement considerations (**Obstacles**)

- Lack of confidence in particle counters to measure fibers as well as spherical materials
- What does it mean when there is evidence of nanomaterial from TEM (or SEM) analysis but particle number concentration is at background level or vice versa?
- Need for quantitative EM methods



## 2. Analyzing and evaluating data

- Due to the inconsistent use of instrumentation, **contextual data** on the handling of ENP and control measures are even more important.
- How to correlate activities/task with measurement results?
- How to aggregate all data into a final result on something like “ the likelihood of exposure”

## 3. Core information for data storage

- Exposure scenario building, exposure modeling, or meta-analysis for risk assessment or epidemiology.
- Need for international harmonization for data storage, at minimum everyone should be collecting same type of data.

# Conclusions (Part 1)

- Measuring toward an **OEL** would be ideal.
- Protocols for reporting results from imaging techniques should be developed.
- The use of imaging analysis software for size, surface area, counting and shape measurements should be explored.

# Conclusions (Part 2)

- It was agreed that standard sampling protocols should be developed. This protocol should include **a tiered approach** depending on what the data will be used for.

Tier 1 (Initial assessment)	Tier 2 (Simplified measurements)	Tier 3 (In depth assessment)
CNT, CNF	CNT, CNF	CNT, CNF
All other ENMs	All other ENMs	All other ENMs

# To Be Continued

October 2012 in Helsinki, **Finland**

## Further Reading

Derk Brouwer, Markus Berges, M. Abbas Virji, Wouter Fransman, Dhimiter Bello, Laura Hodson, Stefan Gabriel, and Erik Tielsmans [2012]. **Harmonization of Measurement Strategies for Exposure to Manufactured Nano-Objects; Report of a Workshop.** Ann. Occup. Hyg. 56 (1) pp1-9.