1. Overview

On 7 September 2018, UNITAR and OECD, with financial support from the Government of Switzerland, organized a workshop in Geneva, Switzerland, on nanosafety, focusing on participants from the African and Asia-Pacific regions. This workshop took place as part of a series of workshops on manufactured nanomaterials and nanotechnologies, the emerging policy issue under the Strategic Approach to International Chemicals Management (SAICM). Twenty-four participants attended the workshop, from governments, intergovernmental organizations, non-governmental organizations, and civil society.

The below workshop summary provides some key points and outcomes from the workshop: the presentations and associated documents can be found on the UNITAR website (alongside the agenda, the list of participants and this workshop summary).

2. Inter-governmental work on Chemicals Management

The representative of UNITAR presented updates in international policy, noting resolution IV/2 from the fourth session of the International Conference on Chemicals Management (ICCM4), in September 2015. This reaffirmed previous resolutions and encourages SAICM stakeholders to address the sound management of manufactured nanomaterials in relevant national and international instruments, including regulatory frameworks, among other activities.

The relevance of the Global Chemicals Outlook was also presented, with a chapter on “SAICM emerging policy issues: state of the knowledge” under development. Participants were encouraged to support the review process, if desired, with a launch scheduled for March 2019.

Decision 13/17 of the Basel Convention was outlined, indicating new work to be undertaken on waste containing nanomaterials. A report on issues related to waste containing nanomaterials and options for possible work under the Basel Convention was considered by the Open-ended Working Group at its 11th meeting, in the preceding days (Geneva, 3-6 September 2018). It is expected that this will help stimulate further the discussion of nanomaterials and their potential effects on human health and the environment, and lifecycle issues.

Work under the United Nations Economic Commission for Europe’s sub-committee of experts on the Globally Harmonized System of Classification and Labelling (GHS) continues to consider the applicability of the GHS to nanomaterials.

The World Health Organization (WHO) released guidelines in 2017 on protecting workers from potential risks of manufactured nanomaterials (with more information provided later in the workshop).

3. Overview of UNITAR’s work on manufactured nanomaterials and nanotechnologies

The representative of UNITAR outlined recent work. National policy development projects have been completed in Armenia, Vietnam and Jordan. A summary was also provided of the outcomes of the 2015 nanosafety workshops in the African, Asia-Pacific, and Latin American and Caribbean regions. Each region created a
nanosafety network from among the participants, identified and prioritized needs in the respective regions, and committed to sharing information among experts and national focal points.

The UNITAR representative also noted the e-Learning course on nanosafety that is available, but has not recently had enough interest from participants to take place. With integration of information from the 2017 WHO guidelines, this may be revised and offered again to the public.

4. Introduction to the International Chemical Safety Cards (ICSCs)

The representative from the WHO introduced the cards, which is a joint programme WHO-ILO. They are a simple, workplace-oriented hazard communication tool on chemicals, including Globally Harmonized System of Classification and Labelling (GHS) information. They serve to complement, but not replace, safety data sheets. Currently, there are more than 1,700 cards available in 9 languages.

The WHO guidelines have a recommendation to assign hazard classes to manufactured nanomaterials according to the GHS. New ICSCs are to be created for nanoforms of chemicals, starting with three pilot substances: Titanium dioxide (TiO$_2$), Zinc Oxide (ZnO) and one other (possibly Cerium Oxide, CeO$_2$)

5. Overview of OECD’s work on manufactured nanomaterials

The representative from OECD introduced the various aspects of OECD’s work, notably on testing and assessment, exposure and risk assessment.

The main areas of work for 2018-2020 will be test guidelines for hazard characterisation of manufactured nanomaterials, and exposure assessment and exposure mitigation.

6. WHO guidelines on protecting workers from potential risks of manufactured nanomaterials

WHO’s mandate covers all aspects of public health, including occupational health, which has been on the organization’s agenda since its inception. This is the first global guideline for occupational health.

A WHO guideline:

- assists providers and recipients of health care and other stakeholders to make informed decisions
- contains recommendations about health interventions (clinical, public health or policy)
  - A recommendation implies a choice between different interventions that have an impact on health and that have implications for the use of resources.
  - The recommendations may be: 1) Strong – for everyone, or 2) Conditional – will probably be adapted according to local context

WHO has adopted the GRADE approach for recommendations (Grading of Recommendations, Assessment, Development and Evaluations), for the transparency of processes and the evidence used. The guidelines had two guiding principles, the precautionary approach and a hierarchy of controls.$^1$

The background work concluded that there is sufficient information available to provide interim recommendations and guidance about approaches to handling of nanomaterials in the workplace (applying the precautionary approach). The target group for the guidelines has two phases: 1) policy-makers in low- and medium-income countries, and (potentially) 2) as an implementation guide for employers and workers.

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$^1$ Hierarchy of controls: The implementation of controls to reduce workers’ exposure should be considered the goal of a successful industrial hygiene programme: eliminate the hazard; substitute the hazardous material by a less harmful agent; apply engineering controls such as isolation, local exhaust ventilation or dust suppression techniques; consider administrative controls such as worker education, and training or scheduling; use as a last resort, personal protective equipment (PPE).
A senior expert (Jos Verbeek), who supported the development of the guidelines, provided further information and facilitated the agenda item. He outlined five recommendations. These are:

1. **Assess health hazards of manufactured nanomaterials**
   a. Assign hazard classes to all manufactured nanomaterials according to the Globally Harmonized System of Classification and Labelling of Chemicals for use in safety data sheets. For a limited number of manufactured nanomaterials, this information is made available in the guidelines.
   b. Update safety data sheets with manufactured nanomaterial-specific hazard information or indicate which toxicological endpoints did not have adequate testing available.
   c. For the respirable fibres and granular biopersistent particles’ groups, use the available classification of manufactured nanomaterials for provisional classification of nanomaterials of the same group.

2. **Assess exposure to manufactured nanomaterials**
   a. Assess workers’ exposure in workplaces with methods similar to those used for the proposed specific occupational exposure limit (OEL) value of the manufactured nanomaterial.
   b. Assess whether workplace exposure exceeds a proposed OEL value for the manufactured nanomaterial. A list of proposed OEL values is provided in Annex 1 of the guidelines.
   c. If specific OELs for manufactured nanomaterials are not available in workplaces, use a stepwise approach for inhalation exposure. For dermal exposure assessment, there was insufficient evidence to recommend one method of dermal exposure assessment over another.

3. **Control exposure to manufactured nanomaterials**
   a. Focus control of exposure on preventing inhalation exposure with the aim of reducing it as much as possible
      i. especially during cleaning and maintenance, collecting material from reaction vessels and feeding manufactured nanomaterials into the production process.
      ii. In the absence of toxicological information, implement the highest level of controls to prevent workers from any exposure. When more information is available, take a more tailored approach.
   b. Use the principle of hierarchy of controls
   c. Prevent dermal exposure by occupational hygiene measures such as surface cleaning and the use of appropriate gloves.
   d. When assessment and measurement by a workplace safety expert is not available, use control banding for nanomaterials to select exposure control measures in the workplace.

4. **Health surveillance should be in place**

5. **Training and involvement of workers is needed**

In terms of best practice, the guidelines suggest:

1. Classifying manufactured nanomaterials into three groups: specific toxicity, respirable fibres, and granular biopersistent particles.
2. Worker involvement: workers should be involved in health and safety issues, leading to more optimal control of health and safety risks.
3. Training and education of workers: workers potentially exposed to manufactured nanomaterials should be educated on the risks of and trained in how they can best protect themselves.
7. Working group discussion on the WHO guidelines

The participants were then invited to provide comments on the guidelines, using the following questions as prompts:

1. Can you provide examples of how you can implement these guidelines in your organization?
2. Which recommendations do you consider most important to be implemented?
3. What is needed most for implementation? (e.g. information, expert training, financial support, local OEL)
4. Is the current occupational health infrastructure sufficient to deal with MNM problems?
5. Should there be additional regulation specifically aimed at containment of potential risks of MNMs?

Discussion – summary notes

- There was a suggestion to expand the classification of hazardous properties to most used/available nanomaterials, or to fill in the gaps in current research.
- WHO clarified that these guidelines are only a “recommendation”, so it is up to Member States to take these into account and adapt as they see fit.
- The senior expert clarified that workers are generally considered to be the most exposed; it was therefore initiating guidelines with workers in mind as a first step.
- Several participants noted an interest in the waste stage of nanomaterials; this can still affect workers. Furthermore, this is of direct relevance to the Basel Convention.
- One participant noted that it is important to develop national situation reports to ascertain what is in the country, who is producing what materials/products, and then develop national policies.
- Further participants encouraged a focus on national situations, alongside information exchange, awareness-raising and capacity building.
- A discussion took place on the hierarchy of controls, with one participant suggesting that increased R&D work requires greater attention to personal protective equipment. Other controls along the hierarchy may be of more relevance; for example, asking for granular forms rather than powdered forms of substances.
- The senior expert proposed that it is necessary to share the information that is available, such as the guidelines and the WHO/ILO ICSCs, and that relevant parts are implemented.
- One participant noted a concern of how these guidelines may be implemented in non-OECD countries, and made a request for support (technical and funding) to implement these.
- One participant also noted how one country has a code of conduct available for use of nanomaterials, though it is not widely used. Furthermore, a research risk platform is being developed to help support regulated companies and the use of nanomaterials.

8. OECD Good Laboratory Practices and Test Guidelines

The representative from the OECD introduced more specific work on mutual acceptance of data, good laboratory practices and test guidelines.

By combining a single quality standard for testing of all chemical substances (test guidelines) and a single quality standard for test facilities throughout the OECD (good laboratory practices), data generated shall be accepted in
OECD Member countries for the purposes of assessment and other uses relating to the protection of humans and the environment.

This helps to avoid duplicate testing, has been shown to save EUR150 million per year, reduces animal testing, and facilitates more and quicker evaluations.

The first test guideline, (TG318) for dispersion behaviours of nanomaterials in different environmental media, is now published. This guideline aims to determine the dispersion stability of nanomaterials in aqueous media independent of environmental conditions.

9. Updates from the region

Participants from the region were invited to provide updates on their work, in relation to nanosafety, including from Mr. Joseph Molapisi (BCRC South Africa) and Ms. Pavadee Aungkavattana (Nanotec, Thailand).

For more information, please access the presentations saved online, or contact the presenters directly.

10. Prioritising needs, identifying common issues, steps for the future

The representative of the OECD underlined that there is much progress that has been made and work being done. It is important to make sure that this is shared, ensuring that stakeholders are not just receiving it, but also have things to contribute.

One participant re-iterated a desire to focus on establishing assessments of the current situation in countries, with regards to availability and use of nanomaterials. Furthermore, it is important to strengthen institutional coordination mechanisms to consolidate efforts. It was also suggested that more knowledge exchange takes place, in order to show the progress made and foster greater support; it may be possible that “advanced materials” will become a priority area of work, and nanomaterials can be part of this.