

The occupational health and safety effects of new nanomaterials are mostly unknown. This can be attributed to the relatively recent development of the nanotechnology sector and, as a result, the lack of available information on human exposures and working conditions. As a consequence our abilities to accurately predict the impact of some nanomaterials exposures on worker health are limited at this time. In particular our abilities to measure nanoparticles in the workplace (or more generally) are limited by current technologies.

Nanotechnology presents us with new challenges as the properties of nanomaterials now depend on size and shape as much as the more conventional factors of chemical structure and composition. Measuring these additional attributes will be necessary to accurately assess nanomaterials in the workplace. In addition, the capability of the human body to recognize and appropriately respond to most nanomaterials is essentially unknown at the moment. On the other hand, in the case of some nanostructured materials, such as carbon black and synthetic amorphous silica, toxicologic and epidemiologic data are available.

There are many gaps in current science about identifying, characterizing, and evaluating potential occupational exposures in the nanotechnology context. These gaps in our knowledge will best be addressed at a multidisciplinary level. Occupational health practitioners and scientists and practitioners in the toxicology field including medical scientists and environmental scientists have vital roles to play in safeguarding health in this fast-moving field. Collaborative studies - ideally with international coordination - are essential in order to provide the critical information required within a reasonable time frame.

## 2. Scope

This Technical Report describes health and safety practices in occupational settings relevant to nanotechnologies. The initial outline was prepared using U. S. NIOSH's Approaches to Safe Nanotechnology: An Information Exchange with NIOSH. <sup>1</sup> This Technical Report focuses on the occupational manufacture and use of engineered nanomaterials. It does not address health and safety issues or practices associated with nanomaterials generated by natural processes, hot processes and other standard operations which unintentionally generate nanomaterials, or potential consumer exposures or uses, though some of the information in this Technical Report might be relevant to those areas. For more general information on the environment, health and safety of nanotechnologies, the reader can refer to other existing well documented reviews.<sup>2-7</sup> Use of the information in this Technical Report could help companies, researchers, workers and other people to prevent adverse health and safety consequences during the production, handling, use and disposal of manufactured nanomaterials. This advice is broadly applicable across a range of nanomaterials and applications.

This Technical Report is based on current information about nanotechnologies, including characterization, health effects, exposure assessments, and control practices. The authors of the Technical Report have attempted to remain current with the use of terms and their definitions. However, definitions in this field are evolving and some terms have not yet undergone ISO consensus review. Therefore, the terms are intended to be used solely for the purpose of this Technical Report and not to be considered formal definitions beyond this Technical Report. It is expected that this Technical Report will be revised and updated and new safety standards will be developed as our knowledge increases and experience is gained in the course of technological advance.