

NIOSH Nanotechnology Program major achievements

National Institute for Occupational Safety and Health (NIOSH) conducts and supports studies that aim at identifying potential occupational health implications of engineered nanomaterials, and translates those findings into effective workplace practices. Achieving these goals is critical to helping the U.S. remain strong and competitive in the dynamic nanotechnology market.

Since its inception in 2004, the NIOSH Nanotechnology Research Center (NTRC) led federal research and made several key advances in areas critical to incorporating occupational safety and health into this emerging industry: nanomaterial exposure, toxicity, characterization, risk, and control. Specifically, NIOSH researchers conducted pioneering studies on toxicity and potential health impact of inhaled nanoparticles and carbon nanotubes. This research effort developed a first-of-its-kind approach to simulating workplace exposures for toxicity testing. Since 2004, NTRC has published over 105 research papers on nanotechnology and occupational health in peer reviewed journals, including a significant study on the toxicity of carbon nanotubes, case studies on workplace exposure assessment and control, and guidance on risk management for nanomaterials.

NIOSH scientists conducted 20 intensive on-site scientific evaluations of actual nanotechnology processes in partnership with industrial, academic, military, and research organizations. NIOSH assessed potential exposures and evaluated operational experiences at the sites, control technologies, personal protective equipment, and work practices. The on-site visits provided valuable information for good occupational safety and health stewardship at the operations that were studied.

Key findings from field investigations and laboratory research were incorporated into NIOSH's interim guidance document, "Approaches to Safe Nanotechnology," which has been cited and recognized internationally as a prime guidance document. For example, it served as a model for and is heavily cited in the new International Organization for Standardization (ISO) technical report, ISO/TR 12885:2008, "Health and safety practices in occupational settings relevant to nanotechnologies."

In 2009, NIOSH issued interim guidance on medical surveillance of workers potentially exposed to engineered nanoparticles in the production and industrial use of nanomaterials, which was released in a draft form in 2007. Such guidance has been sought widely by employers, workers, and health and safety practitioners since medical surveillance is vital for early warning of workplace exposures and conditions that may pose occupational health risks.

NIOSH worked with international partners to develop and disseminate research results and guidance materials in addressing nanotechnology and occupational health globally. Specifically, NIOSH led the development of globally harmonized exposure measurement and mitigation approaches for engineered nanomaterials through the Organization for Economic Cooperation and Development (OECD) Working Party on Manufactured Nanomaterials.