Nanotechnology Research Center

July 2018

What are our priorities?

The Nanotechnology Research Center (NTRC) of the National Institute for Occupational Safety and Health (NIOSH) conducts research to understand the potential effects on human health of exposure to engineered nanomaterials and develops methods to control or eliminate exposures. Nanoparticles are extremely small particles (between 1 and 100 nanometers) designed to have certain new or unique characteristics, like strength, elasticity, or reactivity. These new properties make advanced materials and products possible. NTRC works with partners in industry, labor, government, trade associations, professional organizations, and academia. NTRC focuses on these areas:

- Increasing understanding of potential health risks to workers making and using nanomaterials.
- Preventing occupational exposures to nanomaterials.
- Evaluating potential worker health risks from advanced material and manufacturing processes.

What do we do?

- Identify engineered nanomaterials emerging into commerce through market forecasting and research, technology surveillance, and partner and stakeholder input.
- Prioritize the growing number of engineered nanomaterials for lab and field research, so we can focus on the ones that have the greatest potential for exposure and harm to workers.
- Conduct laboratory research to expand our understanding of the underlying biological mechanisms and the effects of exposure over time and across the life cycle.
- Conduct field investigations and epidemiological studies for a realistic understanding of exposure and risks to nanomaterial workers.
- Issue recommendations on how to use engineering controls and personal protective equipment to mitigate exposure to engineered nanomaterials.
- Provide critical input into the U.S. cross-agency National Nanotechnology Initiative and other international organizations' strategies to address health and safety of nanomaterials.
- Provide nanomaterial businesses with guidance they can use to keep their workers safe, develop public trust, and in turn accelerate their commercialization.
- Help companies function in the face of uncertainty about potential adverse effects of engineered nanomaterials.

What have we accomplished?

- Published 101 journal articles in the peer—reviewed scientific literature during 2017.
- Published a new chapter in the NIOSH Manual of Analytical Methods, 5th Ed. on the use of electron microscopy to analyze workplace air samples for carbon nanotubes/fibers.
- Published one of the first papers to look at toxicity along the lifecycle of a nanomaterial to provide context to potential health effects.
- Expanded research in additive manufacturing and published laboratory and field study results that characterize 3D printer emissions.
- Characterized 22 commercial spray products claiming nano or collodial silver as the active ingredient and found a high degree of variability between claimed and measured values.
- Published a series of three nanomaterial handling recommendations, "Workplace Design Solutions."
- Published a workplace poster, *Controlling Health Hazards When Working with Nanomaterials: Questions to Ask Before You Start*.

What's next?

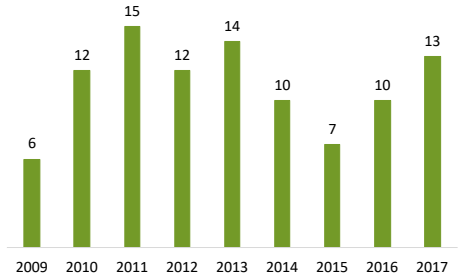
- Publish "Current Intelligence Bulletin: Health Effects from Occupational Exposure to Silver Nanomaterials."
- Evaluate biomarkers, cardiovascular toxicity, and pulmonary exposure to nanoclays and boron nitride nanotubes.
- Complete peer and stakeholder review of the draft "Current Intelligence Bulletin: Approaches to Developing Occupational Exposure Limits or Bands for Engineered Nanomaterials."

At-A-Glance

'Helping Industry Move Safely and Responsibly into the Future'

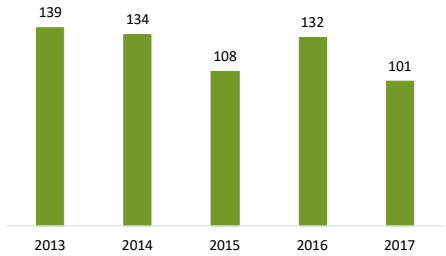
The Nanotechnology Research Center (NTRC) leads the federal government's effort in conducting occupational safety and health research, which is a key component of the U.S. National Nanotechnology Initiative. The NTRC develops recommendations that support responsible development of nanotechnology. This snapshot shows recent accomplishments and upcoming work.

Number of field assessments in nanomaterial manufacturer and user facilities



Source: NIOSH program records

Number of NIOSH Nanotechnology Publications



Source: NIOSH program records

Field investigations have expanded into advanced manufacturing including evaluations of 3D printers (as shown here).

To learn more, visit https://www.cdc.gov/niosh/programs/nano/default.html

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