

The National Institute for Occupational Safety and Health (NIOSH)

NIOSH



Nanotechnology Research Center

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 focuses on the following areas to help industry move safely and responsibly into the future:

- Increasing the public's understanding of potential health risks to workers making and using nanomaterials.
- Preventing occupational exposures to nanomaterials.
- Evaluating potential worker health risks from advanced materials and manufacturing processes.

What do we do?

- Identify new types and uses of engineered nanomaterials through market forecasting and research, technology surveillance, and partner and stakeholder input.
- Prioritize the growing number of engineered nanomaterials for lab and field research, focusing on the ones that have the greatest potential for exposure and harm to workers.
- Conduct laboratory research to expand our understanding of the biological mechanisms underlying 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.
- Share recommendations on how to use engineering controls and personal protective equipment to lower 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 negative effects of engineered nanomaterials.

What have we accomplished?

- Published 80 journal articles in the peer reviewed scientific literature during 2019.
- Published a [science blog](#) with an overview of the Nanotechnology Research Program.
- Conducted a survey to gather information about companies' safety and health practices surrounding the use of engineered nanomaterials (ENMs) to assess the impact of the NIOSH guidance. 45 respondents participated in the survey.
- Expanded field team efforts to evaluate occupational health and safety of 3D printers used in industrial and school settings. This resulted in an increase in the number of field assessments from 8 in 2018 to 20 in 2019 (top figure on right).
- [Expanded](#) the focus of nanotechnology to include advanced materials and manufacturing.

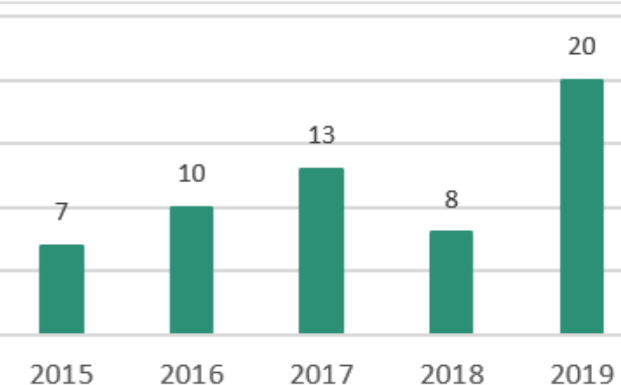
What's next?

- Publish *Current Intelligence Bulletin: Health Effects from Occupational Exposure to Silver Nanomaterials*.
- Publish 2 workplace posters: 3D Printing with Metal Powders: Health and Safety Questions to Ask and 3D Printing with Filaments: Health and Safety Questions to Ask.
- Conduct an evaluation of biomarkers of exposure and disease using proteomic, metabolomics, and bioinformatics approaches.
- Work with industry leaders to develop practical, "real world" evaluation of hazard and risk represented by nanomaterials through their life cycles.
- Collaborate with international standards organizations, such as ASTM International, the Organisation for Economic Co-operation and Development (OECD) and the International Organization for Standardization (ISO) Technical Committee (TC) 229, to develop international standards.
- Provide a draft Technical Report: Approaches to Developing Occupational Exposure Limits or Bands for Engineered Nanomaterials for external peer review.

At-A-Glance

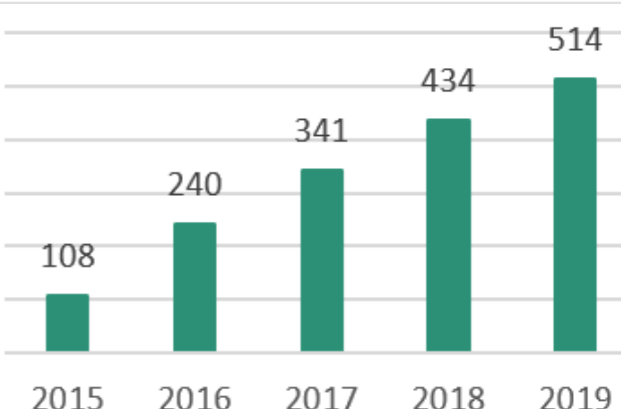
The NTRC develops recommendations that support responsible development of nanotechnology. This snapshot shows recent accomplishments and upcoming work.

Number of field assessments in nanomaterial manufacturer and user facilities



Source: NIOSH program records

Cumulative Number of NIOSH Nanotechnology Publications Since 2015



Source: NIOSH program records

Quality ranking of all ENM SDSs



Source: NIOSH program records. An evaluation of engineered nanomaterial safety data sheets (SDSs) for safety and health information after implementation of the revised hazard communication standard. Total scores of all 67 safety data sheets ranked using the Kimlisch et al. 1997 criteria. Scores above 41 are excellent, scores between 37-40 are good and scores below 36 are unreliable.

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



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