

# NIOSH Resources and Services for the OSH Professional

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Centers for Disease Control and Prevention  
National Institute for Occupational Safety and Health



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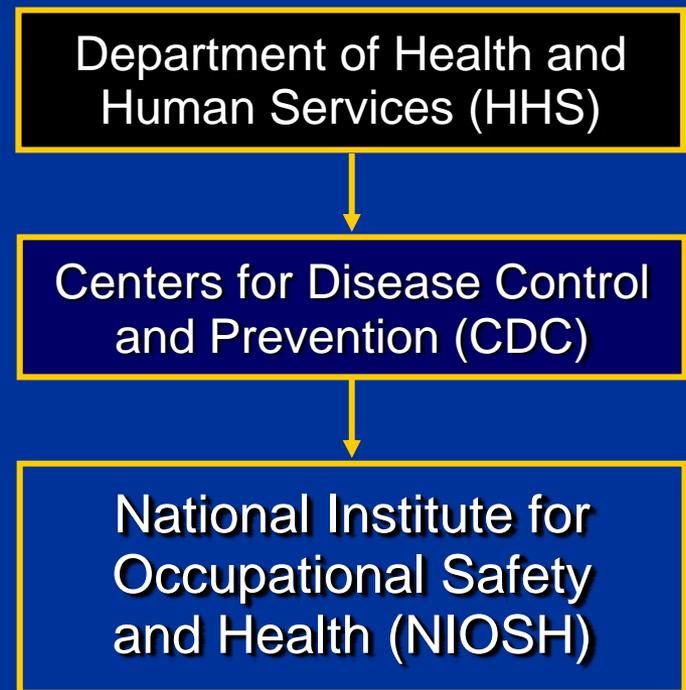
# Occupational Safety and Health

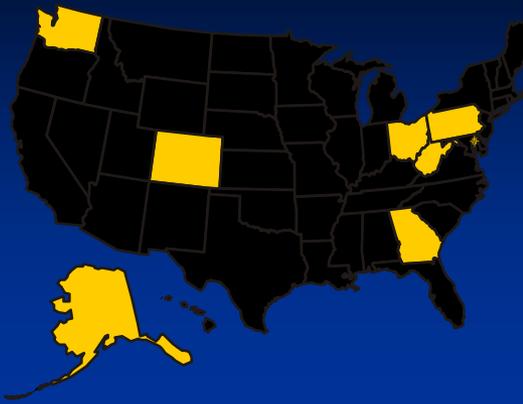
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## *Regulation/Enforcement*



## *Research and Prevention Recommendations*





## NIOSH Locations

- Washington, DC
- Atlanta, GA
- Cincinnati, OH
- Morgantown, WV
- Pittsburgh, PA
- Spokane, WA
- Anchorage, AK
- Denver, CO

# NIOSH Program Portfolio

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- Sector Programs
- Cross-sector Programs
- Emphasis Programs

# Sector Programs

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- Agriculture, Forestry, Fishing
- Construction
- Health Care
- Manufacturing
- Mining w/ Oil & Gas Extraction
- Services
- Transportation, Warehousing & Utilities
- Wholesale & Retail Trade

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National Occupational Research Agenda (NORA): Mai...

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**NORA**



*Research partnerships for safer, healthier workplaces.*

## The National Occupational Research Agenda (NORA)

The National Occupational Research Agenda (NORA) is a partnership program to stimulate innovative research and improved workplace practices. Unveiled in 1996, NORA has become a research framework for NIOSH and the nation. Diverse parties collaborate to identify the most critical issues in workplace safety and health. Partners then work together to develop goals and objectives for addressing these needs. [more...](#)

### Sector Agendas for the Nation

[NORA Sector Councils](#) have created sector agendas for the nation to guide research and research-to-practice. The Councils will update these as needed. All comments sent to the [NORA Coordinator](#) will be forwarded to the relevant Council.

National Public Safety  
Sub-Sector Agenda - April 2009

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# Cross-sector Programs

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- Cancer, reproductive & cardiovascular
- Hearing loss prevention
- Immune & dermal disease
- Musculoskeletal disorders
- Respiratory diseases
- Traumatic injury
- Work organization & stress-related disorders

# Emphasis Programs

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- Economics
- Exposure assessment
- Engineering controls
- Nanotechnology
- Health disparities
- Small business
- Surveillance
- Prevention through Design



**The National Institute for Occupational Safety and Health**

Providing National and World Leadership to Prevent Work-Related Illnesses and Injuries.

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- CHEMICALS
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- > [H1N1 Influenza Virus \(Swine Flu\)](#)
- > [Bicycle Saddles and Reproductive Health](#)
- > [NIOSH Offers Interim Guidance for Worker Medical Screening, Hazard Surveillance Pertaining to Engineered Nanoparticles](#)

### KEY RESOURCES

- [Pocket Guide to Chemical Hazards](#)
- [Manual of Analytical Methods](#)
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In addition to the numbered publications in the list below, NIOSH has issued many other reports and documents which are listed in the [NIOSHTIC-2 database](#).

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May 2009	<a href="#">Determination of Sound Exposures (DOSES): Software Manual and Implementation Guide</a>	
May 2009	<a href="#">Technology News 535 - NIOSH Releases New Educational Video: Escape from Farmington No. 9: An Oral History</a>	
Apr 2009	<a href="#">NIOSH B Reader Certification Program: Looking to the Future</a>	
Apr 2009	<a href="#">Preventing Occupational Exposures to Lead and Noise at Indoor Firing Ranges</a>	
Apr 2009	<a href="#">2008 Direct-Reading Exposure Assessment Methods (D.R.E.A.M.) Workshop</a>	
Apr 2009	<a href="#">Recommendations for the Selection and Use of Respirators and Protective Clothing for Protection Against Biological Agents</a>	
Apr 2009	<a href="#">No-nose Saddles for Preventing Genital Numbness and Sexual Dysfunction from Occupational Bicycling</a>	

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# NIOSH Manual of Analytical Methods (NMAM)

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- NMAM has over 350 methods to determine worker exposure and engineering control effectiveness
- New methods for beryllium in air and on wipes have been published in the 5<sup>th</sup> Edition which is on-line
- NIOSH is considering adapting NIOSH Method 5040, for Diesel Particulate Matter (as elemental carbon), to measure exposure to carboneous nanoparticles

# Health Hazard Evaluation (HHE) Program

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- Requested by the employer, employees, or union official
- NIOSH response may involve phone consultation, written information and recommendations, or a field investigation
- HHE requests are most appropriate when there are serious health effects, complex exposures, exposures to unregulated hazards, health effects occurring at levels below occupational exposure limits
- Guidance documents are available on the NIOSH and other agency websites for addressing indoor environmental quality in nonindustrial settings

# CDC - INFO

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**CDC-INFO** is CDC's consolidated call center that delivers health information to consumers, providers, and professionals calling or e-mailing

- NIOSH publications can be ordered through CDC-INFO
- NIOSH Subject Matter Experts can be contacted through CDC-INFO

Phone (*24 hours a day*) **800-232-4636** or **800-CDC-INFO**

Email: **[cdcinfo@cdc.gov](mailto:cdcinfo@cdc.gov)**

# WorkLife Initiative

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- When implementing workplace programs and policies to sustain and improve workforce health and well-being, make sure to address risk from work in conjunction with risk from individual behaviors
- The IOM report on NASA, "*Integrating Employee Health: A Model Program for NASA,*" is still relevant and important as a guide to the importance of implementing integrated programs  
[www.iom.edu/CMS/3788/18021/26995.aspx](http://www.iom.edu/CMS/3788/18021/26995.aspx)
- A good resource to assist in program development and evaluation is the NIOSH "*Essential Elements of Effective Workplace Programs and Policies*" found on the NIOSH website  
[www.cdc.gov/niosh/worklife/essentials.html](http://www.cdc.gov/niosh/worklife/essentials.html)

# A Framework for the Concurrent Consideration of Occupational Hazards and Obesity

P. A. SCHULTE, G. R. WAGNER, A. DOWNES and D. B. MILLER

*National Institute for Occupational Safety and Health, Centers for Disease Control and Prevention,  
MS-C14, 4676 Columbia Parkway, Cincinnati, OH 45226, USA*

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Occupational hazards and obesity can lead to extensive morbidity and mortality and put great financial burden on society. Historically, occupational hazards and obesity have been addressed as separate unrelated issues, but both are public health problems and there may be public health benefits from considering them together. This paper provides a framework for the concurrent consideration of occupational hazards and obesity. The framework consists of the following elements: (i) investigate the relationship between occupational hazards and obesity, (ii) explore the impact of occupational morbidity and mortality and obesity on workplace absence, disability, productivity and healthcare costs, (iii) assess the utility of the workplace as a venue for obesity prevention programs, (iv) promote a comprehensive approach to worker health and (v) identify and address the ethical, legal and social issues. Utilizing this framework may advance the efforts to address the major societal health problems of occupational hazards and obesity.

*Keywords:* obesity; occupational safety and health; hazards; health promotion; overweight

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# NIOSH Mining Program

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- In-house research and testing with world-class facilities and equipment at labs in Pittsburgh and Spokane
- External research contracts to develop better technologies
- Collaborations with the mining industry, organized labor, and other government agencies
- Work with contractors to commercialize health and safety technologies
- Training materials and best practices for the mining industry
- Capacity building through sponsored university research
- Continual accident surveillance to prioritize our resources with respect to mineworker needs

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## Office of Extramural Programs

The overall goal of NIOSH is the prevention of illnesses, injuries, and deaths caused by hazards on the job. Recognizing the valuable contributions of extramural scientists and educators to this endeavor, NIOSH sponsors research and training through its extramural programs, which complement the Institute's intramural programs. The creativity and special resources available in the extramural community make these programs an important component in achieving a National goal to have safe jobs and healthy workers.

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- [World Trade Center Non-Responders Program](#)
- [Information for FY2009 Mining Research Funds](#) **NEW**

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# NIOSH Office of Extramural Programs

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- Research Grants (RO1, RO3, R21)
- Career Development Grants (KO1)
- Conference Grants (R13)
- Small Business Innovation Awards (R43, R440)
- Cooperative agreements to support state-based OSH surveillance activities
- Centers of Excellence: construction, agriculture, and worklife
- Education and Research Centers
- Training Project Grants

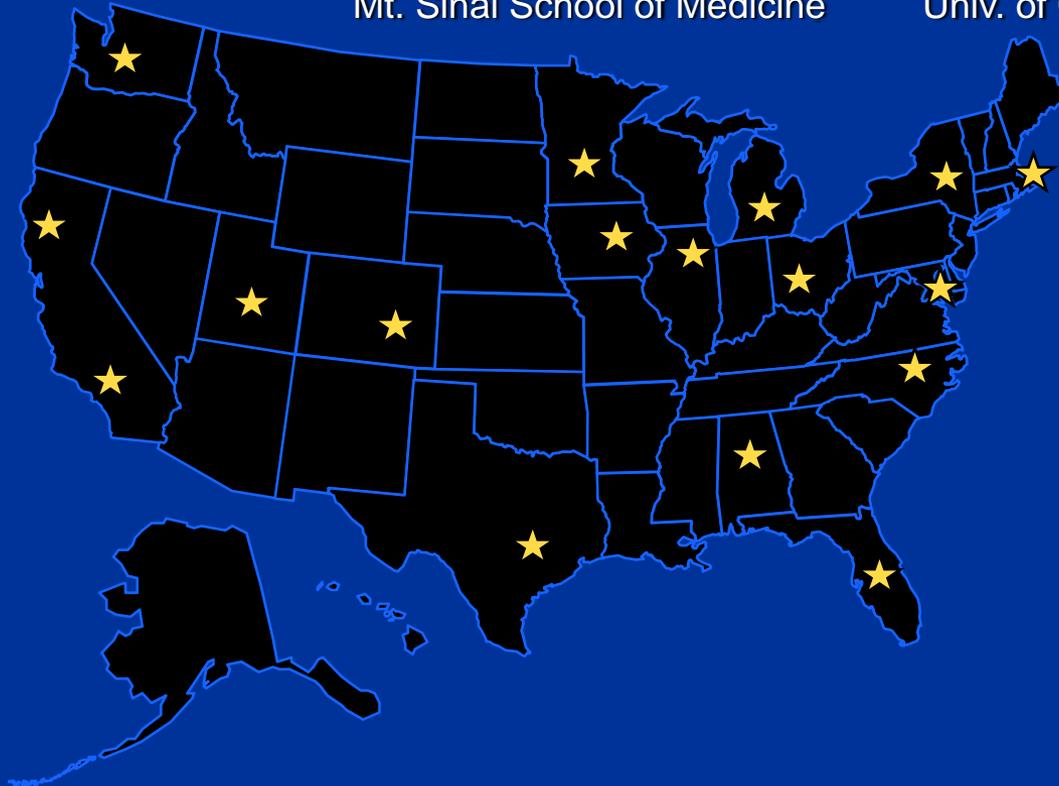
# NIOSH Education and Research Centers (ERCs)

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Univ. of Alabama, Birmingham  
Univ. of California, Berkeley  
Univ. of California, Los Angeles  
Univ. of Cincinnati  
Harvard Univ.

Univ. of Illinois, Chicago  
Univ. of Iowa  
Johns Hopkins Univ.  
Univ. of Michigan  
Univ. of Minnesota  
Mt. Sinai School of Medicine

Univ. of North Carolina  
Univ. of South Florida  
Univ. of Texas  
Univ. of Utah  
Univ. of Washington  
Univ. of Colorado



# NIOSH Training Project Grants (33)

April 2009

## IH

Central Missouri  
MA/Lowell \*  
Oklahoma  
Puerto Rico  
Purdue  
South Carolina  
Toledo  
Tulane  
West Virginia

## OHN

Pennsylvania

## OM

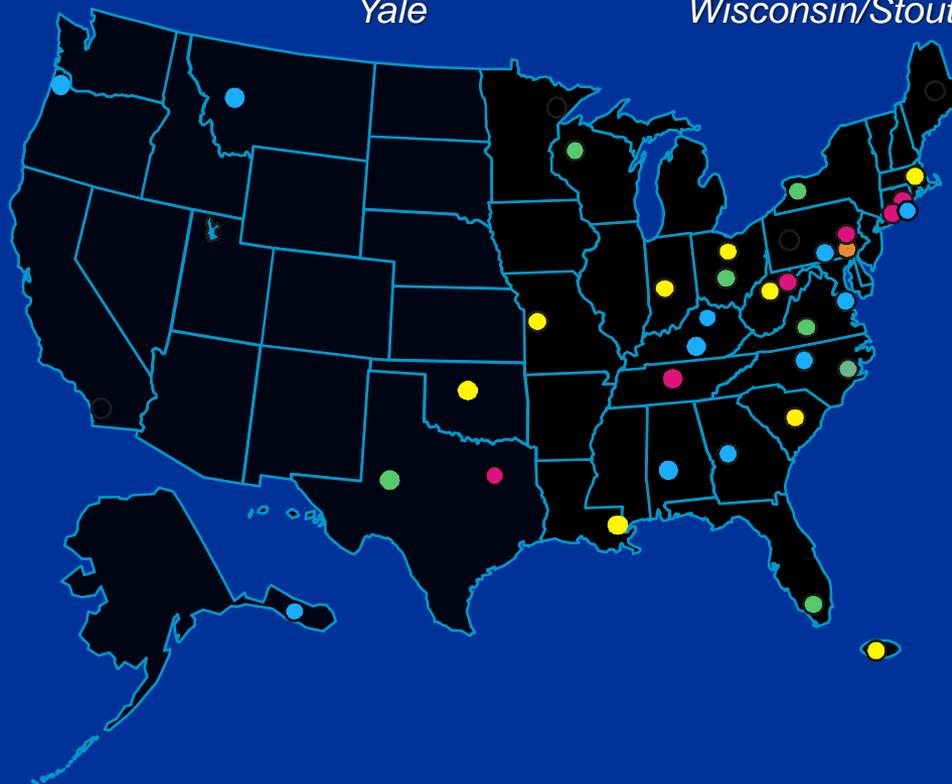
Connecticut  
Meharry #  
Pennsylvania  
Texas/Tyler  
West Virginia \*  
Yale

## OS

Miami  
Ohio State  
SUNY/Buffalo  
Texas Tech  
Virginia Tech  
Wisconsin/Stout

## OS&H

Alaska Marine  
AOEC  
Connecticut  
Emory  
IAFF  
Kentucky  
Millersville  
Montana Tech  
Murray State  
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Portland State



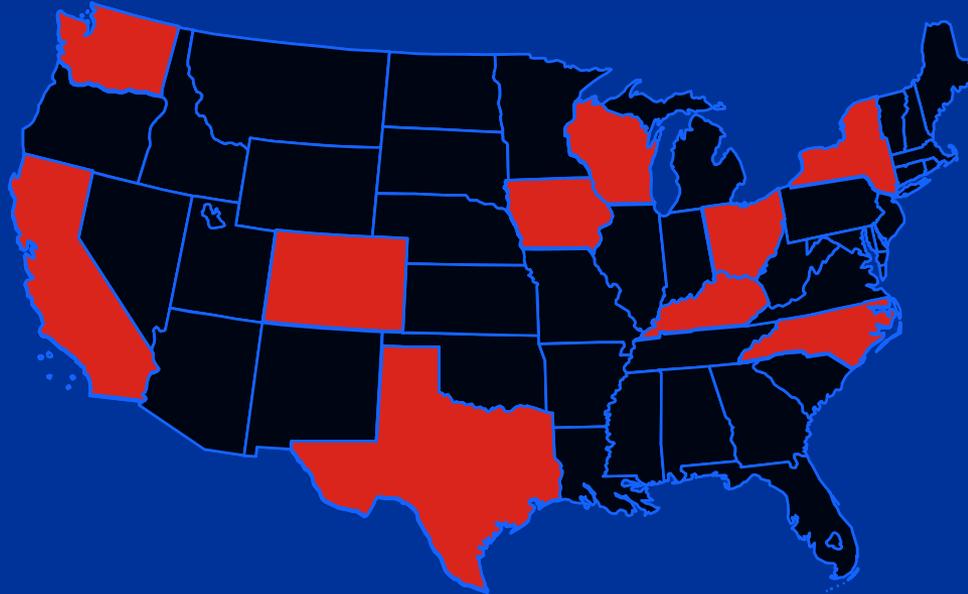
\* Program Project Grants (PPG)

# New

# Information and Capacity Building

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NIOSH Centers for Agricultural Disease and Injury Prevention, Education, and Research



# NIOSH B Reader Program

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- Promotes proper use of the International Labour Office (ILO) classification system to classify chest radiographs for the presence and severity of changes associated with pneumoconiosis
- The ILO system has an important role in surveillance and epidemiology and its role is mandated in a variety of compensation systems
- The NIOSH B Reader Program provides physicians with training in use of the ILO system and documents proficiency through a testing program
- More information at the B Reader Program web page [www.cdc.gov/niosh/topics/chestradiography/breader.html](http://www.cdc.gov/niosh/topics/chestradiography/breader.html)





NIOSH Safety and Health Topic:

## Occupational Respiratory Disease Surveillance

### What is Occupational Respiratory Disease Surveillance?



Occupational respiratory disease surveillance is the ongoing, systematic collection, analysis, and dissemination of health and hazard data to monitor the extent and severity of occupationally-related lung disease and related workplace exposures for use in public health education and in disease prevention.

This NIOSH Topic also includes information about occupational respiratory disease medical screening and monitoring - the systematic evaluation of exposed workers to detect potential

health problems at an early stage and to facilitate action to prevent the development or progression of occupationally-related respiratory disease.

### What's New!



[eWoRLD](#), the electronic version of the **Work-Related Lung Disease Surveillance Report**. [eWoRLD](#) offers the user quick access to all summary tables, figures, and maps of the Report in three formats (html, gif, pdf, and data in csv).



[Miner Identification Form, English and Spanish versions](#): This form must be completed by the miner and accompany all x-rays sent to NIOSH for interpretation as part of the [Coal Workers' X-ray Surveillance Program](#).



[State-Based Surveillance Programs, updated](#): Links to state health departments conducting sentinel (case-based) surveillance for work-related asthma (WRA), silicosis, and/or conducting population-based surveillance for pneumoconiosis as part of

### Occupational Respiratory Disease Surveillance



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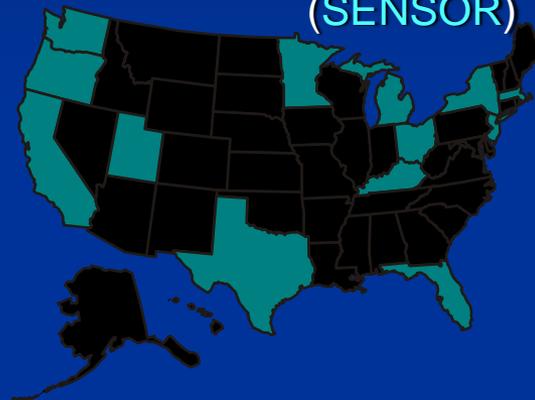
[Other Related Resources](#)

# Surveillance: Tracking Occupational Injuries, Illnesses, and Fatalities

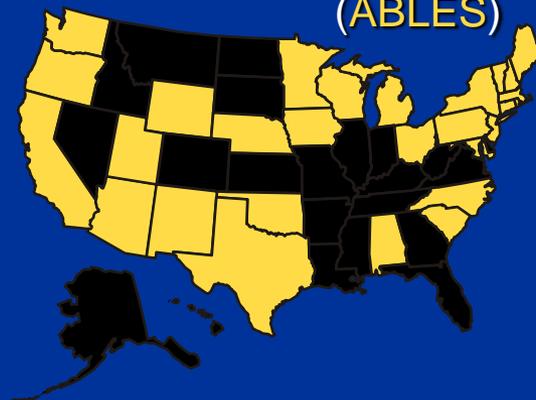
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- National databases
- State-based surveillance
- Collaborations with public and private partners

Sentinel Event Notification System  
for Occupational Risk  
(SENSOR)



Adult Blood Lead  
Epidemiology Surveillance  
(ABLES)



# Fatality Assessment and Control Evaluation (FACE)



# FACE Goals

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- To identify and investigate work situations at high risk for fatal injury
- Formulate and disseminate prevention strategies to those who can intervene in the workplace

**Focus is on prevention—not to determine fault or blame**

# Current Investigation Targets

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- Machinery, e.g., tractors, forklifts, skid-steer loaders
- Youth <18 years of age
- Hispanic workers
- Construction work zones
- Firefighters



# NIOSH Fire Fighter Fatality Investigation and Prevention Program

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- Congressional appropriation in 1998
- Conduct investigations of FF line-of-duty-deaths
- Identify contributory factors and steps that can be taken to prevent future deaths
- Broad dissemination of findings and prevention recommendations



# NIOSH Personal Protective Equipment Program

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- NIOSH Respirator Certification
- NIOSH Respirator Standards Development
- NIOSH Personal Protective Technology Research



# NIOSH Respirator Certification

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- Approximately 300 NIOSH respirator certifications are issued each year
- 90 manufacturers
- 102 manufacturing sites
- 18 countries



# Post Certification Programs

- Respirator Manufacturing Site Audits
- Certified Product Audits
- Certified Product Investigation
- Firefighter SCBA Evaluation
- SCSR Long Term Field Evaluation



# NIOSH Respirator Standards Development

## 42 CFR Part 84 and Other Standards

- CBRN Respirator Standards
- Closed Circuit Escape Respirator (CCER) Standard
- Quality Assurance Standard (QA)
- Powered Air Purifying Respirator (PAPR) Standard
- Total Inward Leakage (TIL) Requirements (filtering facepiece & halfmask respirators)
- Closed Circuit Self-Contained Breathing Apparatus Standard
- Consensus Standards (ISO, ISEA, ASTM, NFPA...)



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## NIOSH Safety and Health Topic: Nanotechnology

### Nanotechnology at NIOSH

NIOSH is the leading federal agency conducting research and providing guidance on the occupational safety and health implications and applications of nanotechnology. This research focuses NIOSH's scientific expertise, and its efforts, on answering the questions that are essential to understanding these implications and applications:

- How might workers be exposed to nano-sized particles in the manufacturing or industrial use of nanomaterials?
- How do nanoparticles interact with the body's systems?
- What effects might nanoparticles have on the body's systems?

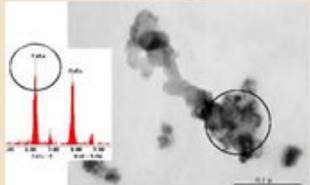
As part of this effort, NIOSH is conducting [strategic planning](#) and research, partnering with public and private-sector colleagues from the United States and abroad, and making the information and interim recommendations widely available. As observers generally agree, research to answer these questions is critical for maintaining U.S. competitiveness in the growing and dynamic nanotechnology market.

#### Nanotechnology on the NIOSH Science Blog

NIOSH recently co-sponsored a workshop focused on research needed for characterizing exposures to nanomaterials among workers, other populations, and environments by measuring and modeling exposure levels, and by monitoring indicators of biological responses through the product life of a nanomaterial.

[Read more and comment on the NIOSH Science Blog.](#)

#### Nanotechnology



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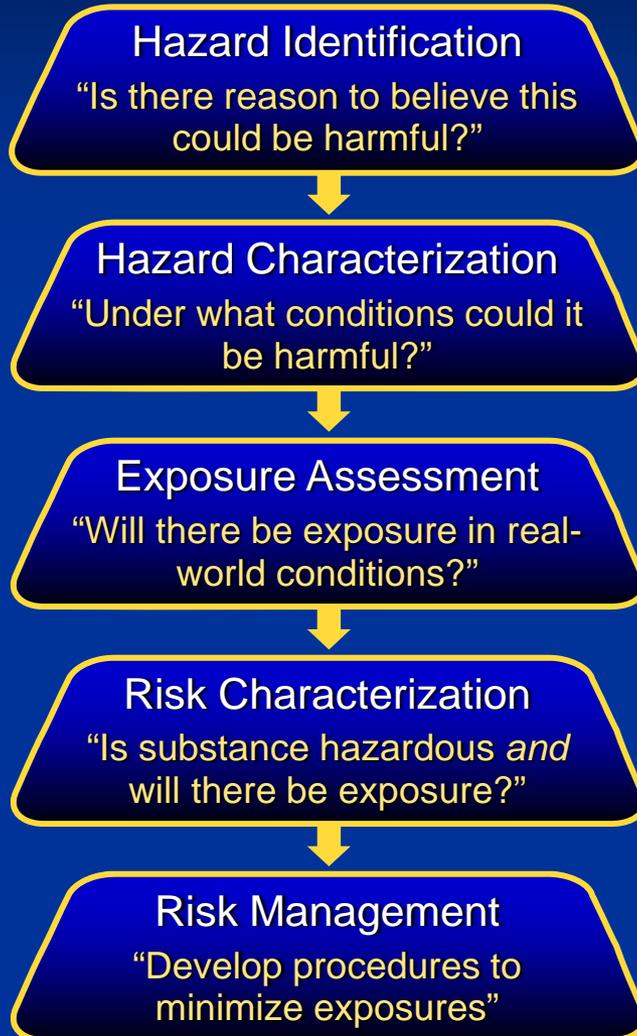
#### NANOTECHNOLOGY SPOTLIGHTS:

##### Scientists Note Importance of Understanding 'Nano/Bio Interfaces'

It is important to study and understand "Nano/Bio Interfaces," or the complex biological and biochemical interactions that occur when nanoparticles first come into contact with the body, an article in the June issue of the peer-reviewed journal Nature Materials states. With this knowledge, scientists can better predict potential

# Nanotechnology Risk Management Process

*Steps to Protect Workers*

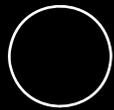


*Adapted from Gibbs, 2006*

## NIOSH Research

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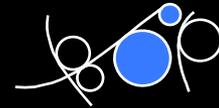
- Toxicologic Research
  - Health Effects Assessment
  - Safety Research
  - Epidemiology and Surveillance
- 
- Toxicologic Research
  - Field Assessment
  - Chemical and Physical Characteristics
  - Process Characteristics
- 
- Metrology Research
  - Field Exposure Assessment
  - Process Descriptions
  - Control Technology Research
  - Personal Protective Equipment (PPE)
- 
- Risk Assessment- Dose and Duration
  - Dose Modeling
  - Exposure Characterization
- 
- Risk Communication
  - Guidance for Controls, Exposure Levels, PPE, and Medical Surveillance
  - Information Dissemination



Spherical homogeneous



Agglomerate homogeneous



Agglomerate heterogeneous



Fibrous homogeneous



Heterogeneous concentric



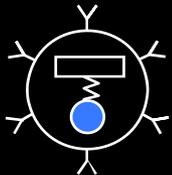
Active particle



Non-spherical homogeneous



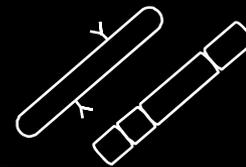
Heterogeneous distributed



Multifunctional particle



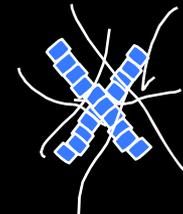
Non-spherical heterogeneous



Fibrous heterogeneous



Agglomerate fibrous homogeneous



Agglomerate fibrous heterogeneous

## Approaches to Safe Nanotechnology

Managing the Health and Safety Concerns  
Associated with Engineered Nanomaterials

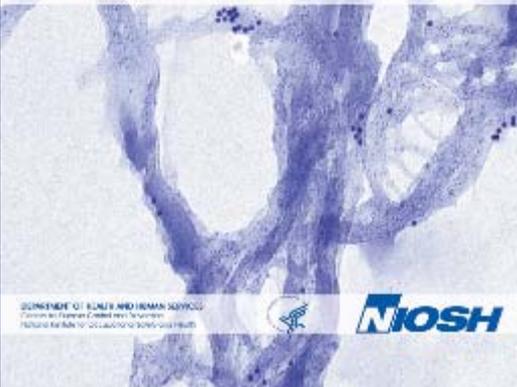


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National Institute for Occupational Safety and Health



## Progress Toward Safe Nanotechnology in the Workplace

A Report from the NIOSH  
Nanotechnology Research Center



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National Institute for Occupational Safety and Health



## Basic Guidance from NIOSH

- Updated and reissued in 2009
- Based on direct experience and applied research results
- Updated as new information is developed
- A starting point for building a responsible nanomaterial management program

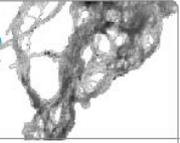
- Research progress in 10 key areas
- Continuing project plans
- Opportunities for collaboration

[www.cdc.gov/niosh/topics/nanotech](http://www.cdc.gov/niosh/topics/nanotech)

# Collaboration

- Share knowledge
- Use expertise
- Build experience
- Partner

## The Nanotechnology Field Research Team Update



In 2006, NIOSH established a Nanotechnology Field Research Team to expand its knowledge and understanding of the potential health and safety risks that workers may encounter during the research, production, and use of engineered nanomaterials. This effort has complimented NIOSH's extensive laboratory-based research program, as well as helped NIOSH identify and more fully understand the variety of work processes used to generate and manufacture engineered nanomaterials. It has also provided NIOSH with the opportunity to observe and evaluate work practices and engineering controls used to ensure worker health and safety in the nanotechnology industry.

NIOSH has conducted site visits to several facilities around the country that are involved in the research, manufacture, or use of various types of nanomaterials including, metal and metal oxide nanoparticles, carbon nanofibers, electrospun nanofibers, quantum dots, fullerenes, and nanocomposites. As a result, NIOSH obtained valuable information that is being used to assist in developing workplace guidance documents to protect nanotechnology workers from occupational injury and illness, and has learned that:



- basic particle counting and sizing instruments can be used to identify emissions from nanomaterial processes,
- careful interpretation of the particle data is needed to differentiate between incidental (background) and process-related nanoparticles, and
- engineering controls do minimize workplace exposure to engineered nanoparticles.

Companies interested in receiving a visit by the Field Research Team are encouraged to contact NIOSH. All site visits are initiated by the respective companies and are completely voluntary. This program is fully funded by NIOSH; therefore, there is no monetary cost to the participant. Three companies who have voluntarily received site evaluations from the NIOSH Field Research Team were recently interviewed by Nanowork, LLC for its August/September 2007 issue of Nanorisk ([www.nanorisk.org/](http://www.nanorisk.org/)). Overall, they described the collaboration as beneficial, and encouraged other companies to take advantage of NIOSH's expertise, services, instrumentation, and unbiased assessments.

For more information about occupational safety and health topics pertaining to engineered nanomaterials, including fact sheets about the Field Research effort and other nanotechnology research programs, please visit the NIOSH nanotechnology topic page at [www.cdc.gov/niosh/topics/nanotech](http://www.cdc.gov/niosh/topics/nanotech). To discuss the possibility of receiving a site evaluation by the NIOSH Field Research Team, contact Charles Geraci, Ph.D., CIH at (513) 533-8339, [CGeraci@cdc.gov](mailto:CGeraci@cdc.gov) or Mark Methner, Ph.D., CIH at (513) 841-4325, [MMethner@cdc.gov](mailto:MMethner@cdc.gov).

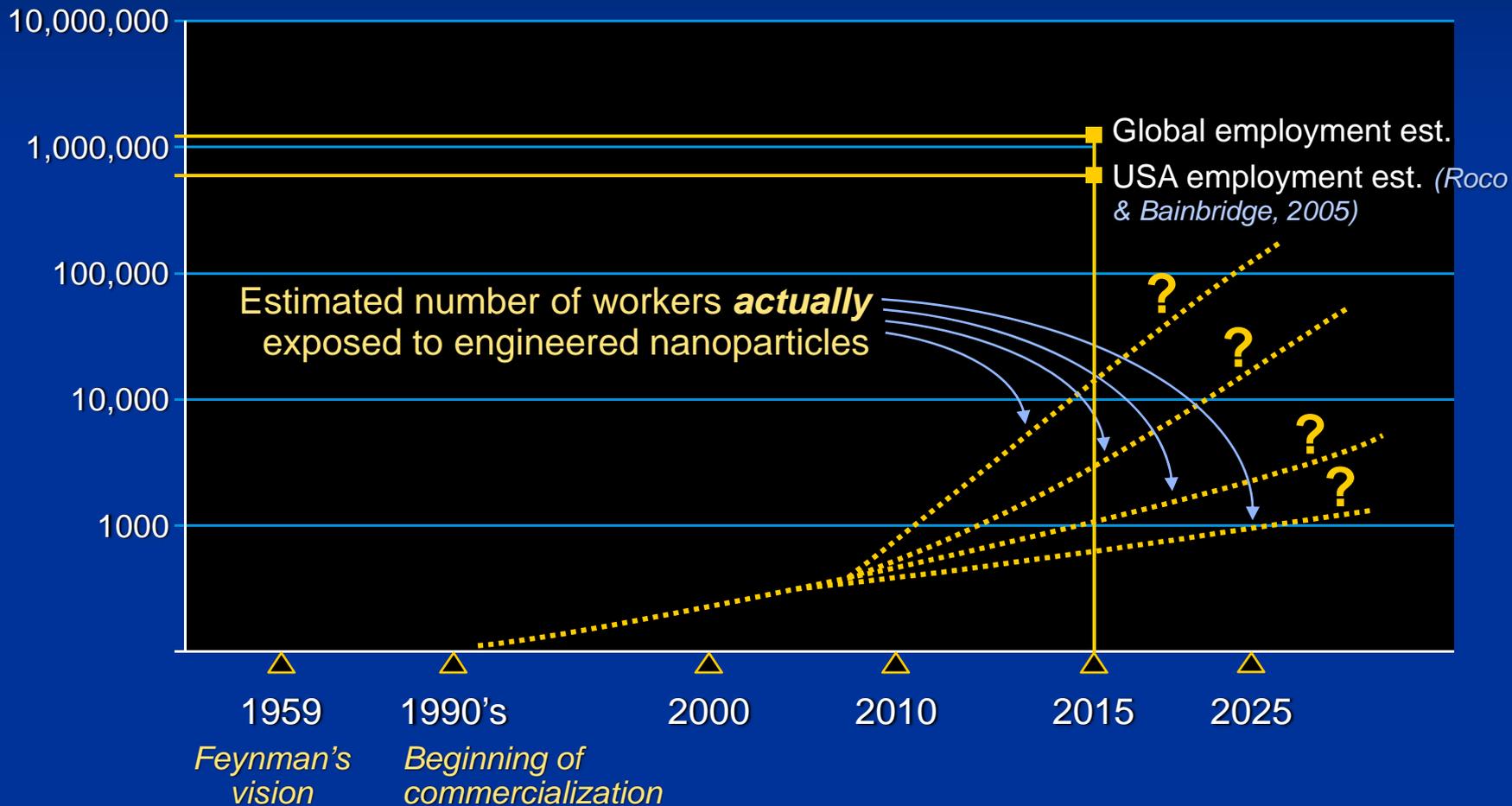
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**NIOSH**  
National Institute for Occupational Safety and Health

# Dilemmas in Identifying Workers Exposed to Engineered Nanoparticles<sup>26</sup>

Number of Workers Exposed





# Prevention through Design

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**Mission:** Eliminate hazards and control risks to workers “at the source” or as early as possible in the life cycle of items or workplaces

- Includes *design, redesign* and *retrofit* of
  - Facilities
  - Tools and equipment
  - Products and substances
  - Work processes and methods
- For more information, please visit the NIOSH PtD website [www.cdc.gov/niosh/programs/PtDesign/default.html](http://www.cdc.gov/niosh/programs/PtDesign/default.html)
- Plan for the PtD National Initiative posted for comment [www.cdc.gov/niosh/review/public/160/](http://www.cdc.gov/niosh/review/public/160/)

## Climate Change and Occupational Safety and Health: Establishing a Preliminary Framework

**Paul A. Schulte and HeeKyung Chun**

National Institute for Occupational Safety and Health, Centers for Disease Control and Prevention,  
Cincinnati, Ohio

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*The relationship between global climate change and occupational safety and health has not been extensively characterized. To begin such an effort, it may be useful to develop a framework for identifying how climate change could affect the workplace; workers; and occupational morbidity, mortality, and injury. This article develops such a framework based on a review of the published scientific literature from 1988–2008 that includes climatic effects, their interaction with occupational hazards, and their manifestation in the working population. Seven categories of climate-related hazards are identified: (1) increased ambient temperature, (2) air pollution, (3) ultraviolet exposure, (4) extreme weather, (5) vector-borne diseases and expanded habitats, (6) industrial transitions and emerging industries; and (7) changes in the built environment. This review indicates that while climate change may result in increasing the prevalence, distribution, and severity of known occupational hazards, there is no evidence of unique or previously unknown hazards. However, such a possibility should not be excluded, since there is potential for interactions of known hazards and new conditions leading to new hazards and risks.*

(e.g., heat stress, death, or injury in floods and storms) and indirectly through changes in the ranges of disease vectors (e.g., mosquitoes), waterborne pathogens, water quality, air quality, and food availability and quality. The IPCC concluded that the actual health impacts will be largely influenced by local environmental conditions and socioeconomic circumstances and by the range of social, institutional, technological, and behavioral adaptations taken to reduce the full range of threats to health.<sup>(1)</sup> Will the occupational safety and health of workers be influenced by climate change and these conditions, circumstances, and adaptations?

To date, most of the climate change research has focused on the health of the general population rather than on occupational health and safety outcomes. Because of the lack of appropriate health, climate, and other relevant data, it has been difficult to assess how climate change has affected workers. How is global climate change related to occupational safety and health? Will the effects on workers be different from the general



# Going Green: Safe and Healthy Jobs

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*Sustainability must include worker safety and green jobs must be safe jobs*

- Enhance the safety and health protection of the American workforce
- Expand and apply our knowledge in occupational safety and health to new workplaces, processes, and products
- Ensure the training and re-training of the workforce that will fill these new jobs includes relevant safety and health information

[www.cdc.gov/niosh/topics/greenjobs/](http://www.cdc.gov/niosh/topics/greenjobs/)

# Framework for Considering Green Jobs and Occupational Hazards

Old

New

Traditional  
Jobs



Green  
Jobs

## What we know

### Construction

Creating energy efficient homes could expose workers to hazards such as formaldehyde in insulation and related health effects

## What we know we don't know

### Energy

Electrical hazards that may arise during installation and maintenance of solar energy panels and generators

### Agriculture

New hazards, equipment, and chemicals linked to Green practices

## What we don't know we know

### Services

Many of the hazards for recycling workers have been identified in other jobs

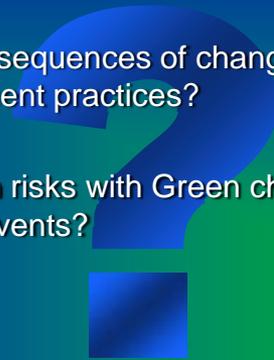
### Energy and Construction

Hazards and protections for building and maintaining wind energy turbines may be similar to experience in construction trades

## What we don't know we don't know

Unintended consequences of changes in supply chain management practices?

Unknown health risks with Green chemicals and dry cleaning solvents?



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## r2p: Research To Practice at NIOSH



The Research to Practice (r2p) initiative at NIOSH is focused on the transfer and translation of knowledge, interventions, and technologies into highly effective prevention practices and products which are adopted into the workplace. r2p is a way of conducting research to help ensure that it is relevant to our stakeholders and results in the reduction of workplaces injuries, illness, and fatalities.

The goal of r2p is to reduce illness and injury by increasing the use of NIOSH-generated knowledge, interventions, and technologies. In order to achieve this, NIOSH continues to work with our partners to focus research on ways to develop effective products, translate research findings into practice, target dissemination efforts, and evaluate and demonstrate the effectiveness of these efforts in improving worker health and safety. NIOSH research is used by workers, employers, and others throughout the world.

### r2p Topics

<p><b>r2p in action</b>            Featured success stories of research to practice across NIOSH</p>	<p><b>Partnership Opportunities</b>            Unique opportunities for commercialization and research collaboration</p>
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### r2p: Research To Practice at NIOSH



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