

NATIONAL OCCUPATIONAL RESEARCH AGENDA

UPDATE *May, 1999*

21 Priorities for the 21st Century



National Institute for Occupational Safety and Health

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Centers for Disease Control and Prevention
National Institute for Occupational Safety and Health

NORATM
National Occupational Research Agenda

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(continued inside back cover)

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Message from NIOSH

Evidence of the continued success of the National Occupational Research Agenda (NORA™) can be found in this third annual NORA Update. Funding and support of NORA, both intramurally and extramurally, increase yearly. The NORA grants program has also been a huge success. In FY 98, NIOSH and four NIH partners awarded 50 grants totaling about \$8 million dollars in ten NORA priority areas. This represents the largest ever single infusion of extramural funding for investigator-initiated occupational safety and health research. The FY 99 Request for Applications (RFA) for NORA research looks just as promising. NIOSH and five NIH Institutes are expected to award more than \$7.5 million in eight NORA priority research areas. Despite these successes, we and our partners are aware that extramural researchers still face disappointing odds when submitting their applications in these high priority areas — with current funding allowing only 14% of approved grants to be funded (compared to a success rate of over twice that in other areas funded by the NIH). It is our goal to increase success rates in the next few years.

While the accomplishments are captured in this document, the true essence of NORA will be found at the NORA Symposium 1999: Partnership for Research. This second symposium highlights the successes of NORA and brings together over 300 NORA participants and supporters from across the country. It is this strong public-partnership network that has made NORA a success. Individuals and organizations throughout government, labor, industry, and academia continue to believe in the importance of and need for this national agenda.

As the title suggests, this year's theme is partnership. Partners from many sectors will discuss their experiences in using NORA to improve worker safety and health. The wide range of NORA partners willing to speak on behalf of NORA says more about the universality and usefulness of NORA than any words I can write. Also at the Symposium, the first **NORA Partnership Award For Worker Health and Safety** will be presented to the Asphalt Partnership. This unique collaboration of government, industry, and labor embodies the true spirit of NORA partnership. This partnership was also selected as a finalist in the Ford Foundation 1998 Innovations in American Government awards program.

We decided to honor partnership because we realize that it is through continued partnership that NORA will achieve its full potential. I'd like to think that the full potential is beyond our current optimistic thinking; if NORA's first three years are any indication, I may just be right.



Linda Rosenstock, M.D., M.P.H.

Director

National Institute for Occupational Safety and Health

NIOSH Vision

Delivering on the Nation's promise:
safety and health at work for all
people...through research and
prevention.

NORA Vision

No single organization has the resources necessary to conduct occupational safety and health research to adequately serve the needs of workers in the United States. These constraints mandate that the entire occupational safety and health community engage in collaboration and coordination of its resources. The National Institute for Occupational Safety and Health (NIOSH) and its public and private partners developed the National Occupational Research Agenda (NORA) to provide a framework to guide occupational safety and health research into the next decade—for NIOSH and the entire occupational safety and health community.

Liaison Committee

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Robin Baker

American Public Health Association

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American Association of Occupational Health Nurses

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Organization Resources Counselors, Inc.

Liaison Committee Perspective

As chair of the NORA Liaison Committee I have closely watched the evolution of NORA over the past four years. I'm proud to say that I have been involved with this process from its' creation though the remarkable successes we see today.

The Liaison Committee embodies the partnership theme reflected in this year's NORA Symposium. Our members represent the diverse nature of the field of occupational safety and health research with representatives from industry, labor, academia, professional organizations and government. It is through this spirit of partnership and commitment to NORA that the committee has been able to function so successfully. I'd like to thank the committee for their dedication and work over the last year.

The Liaison Committee continues to play an active role in tracking the progress of NORA. Through the Measures and Goals subcommittee, our members have undertaken a survey to gauge the effectiveness and reach of NORA in associations (see details on page 23). This year, the Liaison Committee met with the leaders of the NORA Partnership Teams for the first time. This was a wonderful opportunity to hear first hand the accomplishments and challenges facing the 20 NORA teams.

The committee is impressed with and supportive of the NORA implementation activities, especially the NORA grants process. The grant process provides a wonderful example of the role partnerships can play in advancing our goals. Continued support from NORA partners will ensure an even more remarkable impact on occupational safety and health research. I would like to use this opportunity to encourage applications for a NORA-related research award. The American Association of Occupational Health Nurses and the American College of Occupational and Environmental Medicine are sponsoring a joint research award with selection criteria based on NORA priority areas. The purpose of the award is to recognize joint research projects conducted by collaborative research teams of nurses and physicians for the purpose of improving the knowledge base of occupational and environmental health. The deadline for submissions is December 1, 1999. Please contact Margaret Anderson at AAOHN (1-800-241-8014 x 120, Margaret@aaohn.org) for more details.

Many individuals and organizations have contributed to the success of NORA. The Liaison Committee is happy to have been part of this example of true partnership at work.



Bonnie Rogers, DrPH, COHN-S, FAAN

Chair, NORA Liaison Committee

American Association of Occupational Health Nurses

Background - An Agenda for the 21st Century

In April 1996, NIOSH and its partners unveiled the National Occupational Research Agenda (NORA), a framework to guide occupational safety and health research into the next decade—not only for NIOSH but for the entire occupational safety and health community. Approximately 500 organizations and individuals outside NIOSH provided input into the development of the Agenda. Before NORA no national research agenda existed in the field of occupational safety and health, and no research agenda in any field had captured such broad input and consensus. The NORA process resulted in a remarkable consensus about the top 21 research priorities (see table below).

NORA arose out of the recognition that occupational safety and health research in both the public and private sector would benefit from targeting limited resources. The creators of the Agenda also recognized the need to address changes in the U.S. workplace as well as the increasingly diversified workforce. The distribution of jobs in our economy continues to shift from manufacturing to services. Longer hours, compressed work weeks, shift work, reduced job security, and part-time and temporary work are realities of the modern workplace. By the year 2005, the U.S. workforce will grow to an estimated 147 million, minorities will represent 28 percent of the workforce, and women approximately 48 percent.

NORA Priority Research Areas

CATEGORY	PRIORITY RESEARCH AREAS
Disease and Injury	<ul style="list-style-type: none"> Allergic and Irritant Dermatitis Asthma and Chronic Obstructive Pulmonary Disease Fertility and Pregnancy Abnormalities Hearing Loss Infectious Diseases Low Back Disorders Musculoskeletal Disorders of the Upper Extremities Traumatic Injuries
Work Environment and Workforce	<ul style="list-style-type: none"> Emerging Technologies Indoor Environment Mixed Exposures Organization of Work Special Populations at Risk
Research Tools and Approaches	<ul style="list-style-type: none"> Cancer Research Methods Control Technology and Personal Protective Equipment Exposure Assessment Methods Health Services Research Intervention Effectiveness Research Risk Assessment Methods Social and Economic Consequences of Workplace Illness and Injury Surveillance Research Methods

NORA also addressed the broadly recognized need to focus research in the areas with the highest likelihood of reducing the still significant toll of workplace illness and injury. Each day, an average of 9,000 U.S. workers sustain disabling injuries on the job, 16 workers die from an injury sustained at work, and 137 workers die from work-related diseases.

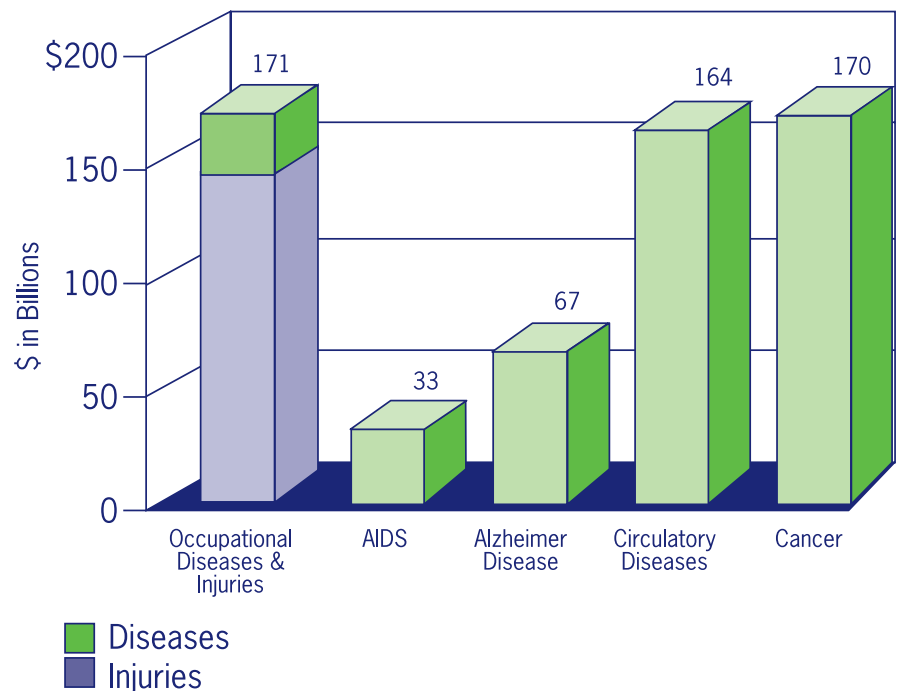
The economic burden of this continuing toll is high. Data from a NIOSH-funded study published in 1997 showed that in 1992, direct and indirect costs of occupational injuries and illnesses totaled \$171 billion (\$145 billion for injuries and \$26 billion for diseases). These costs compare to \$33 billion for AIDS, \$67.3 billion for Alzheimer's Disease, \$164.3 billion for circulatory diseases, and \$170.7 billion for cancer (see graphic below).

Developing NORA was only the first step in the collaborative effort between NIOSH and its many partners to guide and promote occupational safety and health research. Even at the time the Agenda was announced, there was a common commitment to work to implement the Agenda, namely, to increase activities and resources in the 21 priority areas.

In the first three years of the implementation of NORA, NIOSH and its partners have demonstrated that NORA is generating funding and research activities in the 21 priority areas. The 20 partnership teams (the two musculoskeletal priority research areas are being addressed by one team) have been instrumental in this success.

Prior to NORA, research in occupational safety and health was fragmented, suffering from a "shotgun" approach to tackling major problems. Through NORA, we hope to better position the Nation to address the toll of workplace injury and death.

Economic Burden of Disease and Injury (Direct and Indirect Costs)



Measuring the Success of NORA

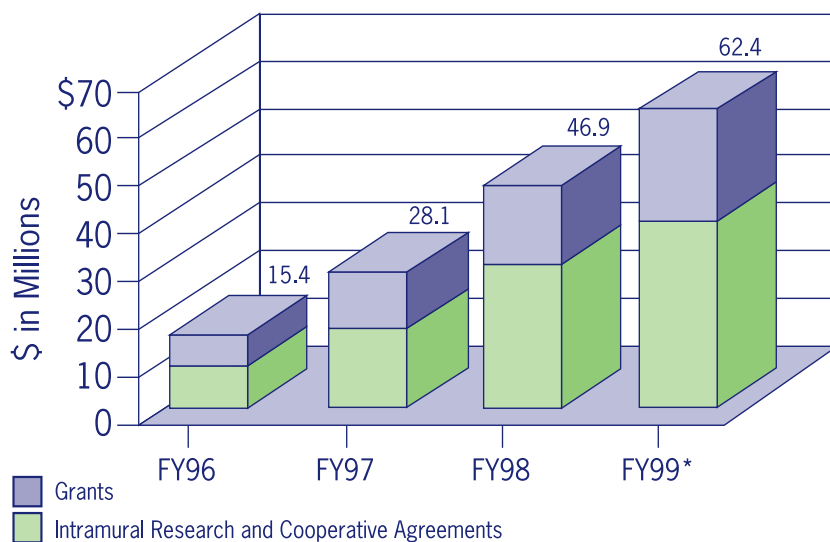
Tracking Research Funding in NORA Priority Areas

NIOSH Funding

As the only Federal agency with a mandate to conduct and fund occupational safety and health research, NIOSH made a commitment to redirect some of its resources to the 21 NORA priority areas. Data are available to track both the number of projects and total economic resources in each priority area.

In FY 96, at the time the Agenda was unveiled, the NIOSH baseline investment in the NORA priority areas was \$15.4 million out of an overall operating budget of \$165.3 million (approximately 9 percent of the FY 96 budget). Of this, \$8.7 million was devoted to intramural research (NIOSH-conducted) and cooperative agreements (NIOSH-funded extramural research that NIOSH initiates and participates in) and \$6.7 million for research grants (extramural investigator-initiated projects). A redirection of resources in FY 97 nearly doubled this investment to \$28.1 million. A new \$5 million special Congressional appropriation to NIOSH in FY 98 for NORA, coupled with additional reinvestment of baseline monies into NORA priority areas, resulted in \$46.9 million of research (about 25 percent of the budget) in NORA priority areas for FY 98.

NIOSH NORA Investment

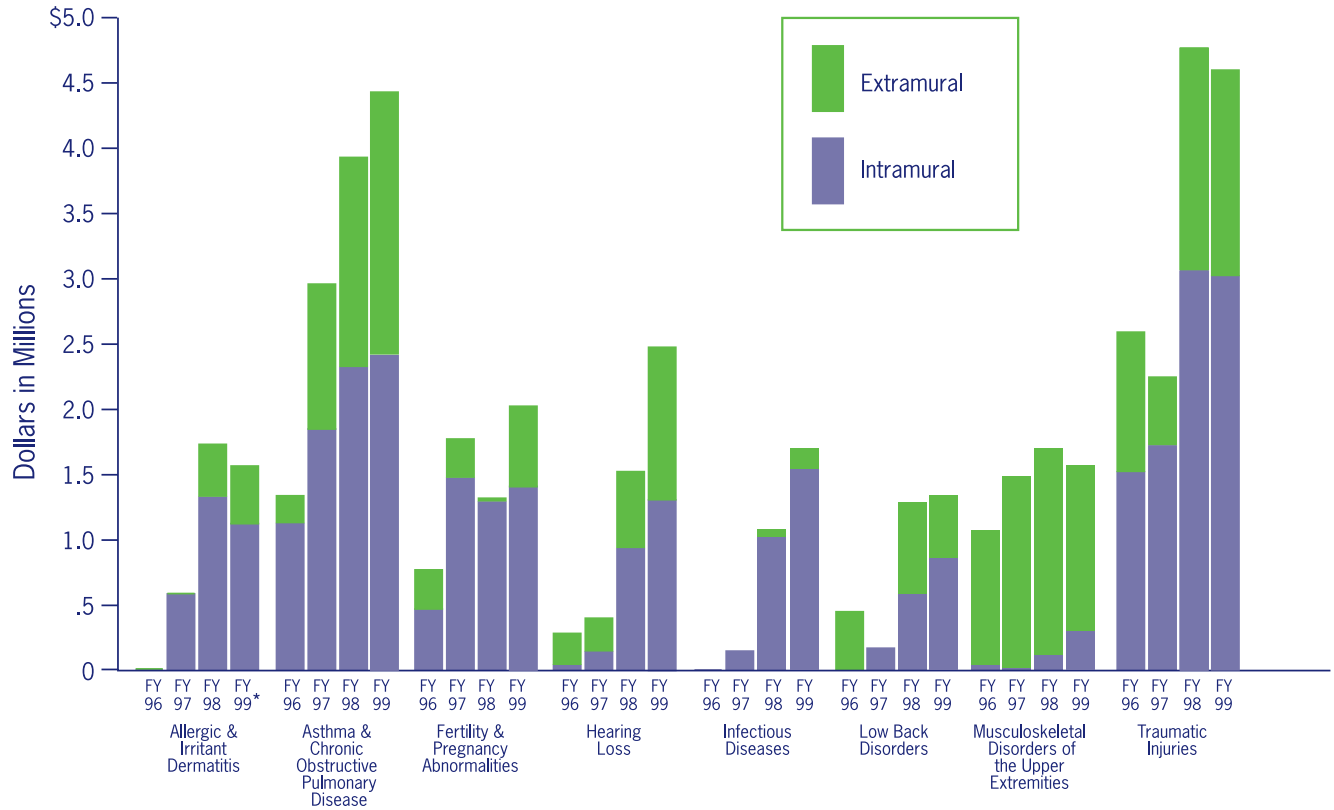


* FY 99 numbers are estimates

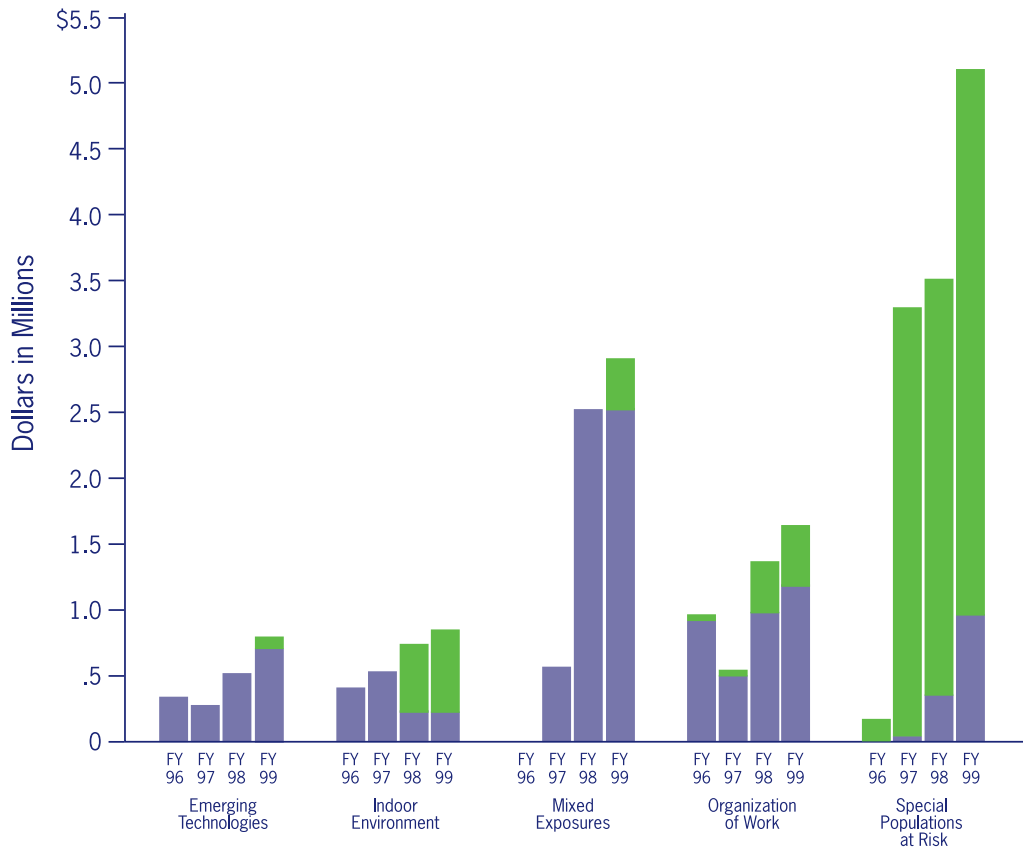
In FY 99, continued Congressional support for NORA as well as ongoing internal resource allocation has resulted in an estimated \$62.4 million of NIOSH research funds (31 percent of the budget) directed at NORA priority areas. Such an increase is tangible evidence of NIOSH's commitment to NORA. This shift is particularly notable given existing Congressional mandates and obligations that limit how much of the NIOSH budget can be redirected. An ongoing effort has been in place from the start to assure that these shifts are "real" (rather than merely a reporting artifact) using consistent definitions and an independent evaluation team to assess projects for NORA-relatedness.

NIOSH NORA Investment by Priority Research Area, FY 96-99

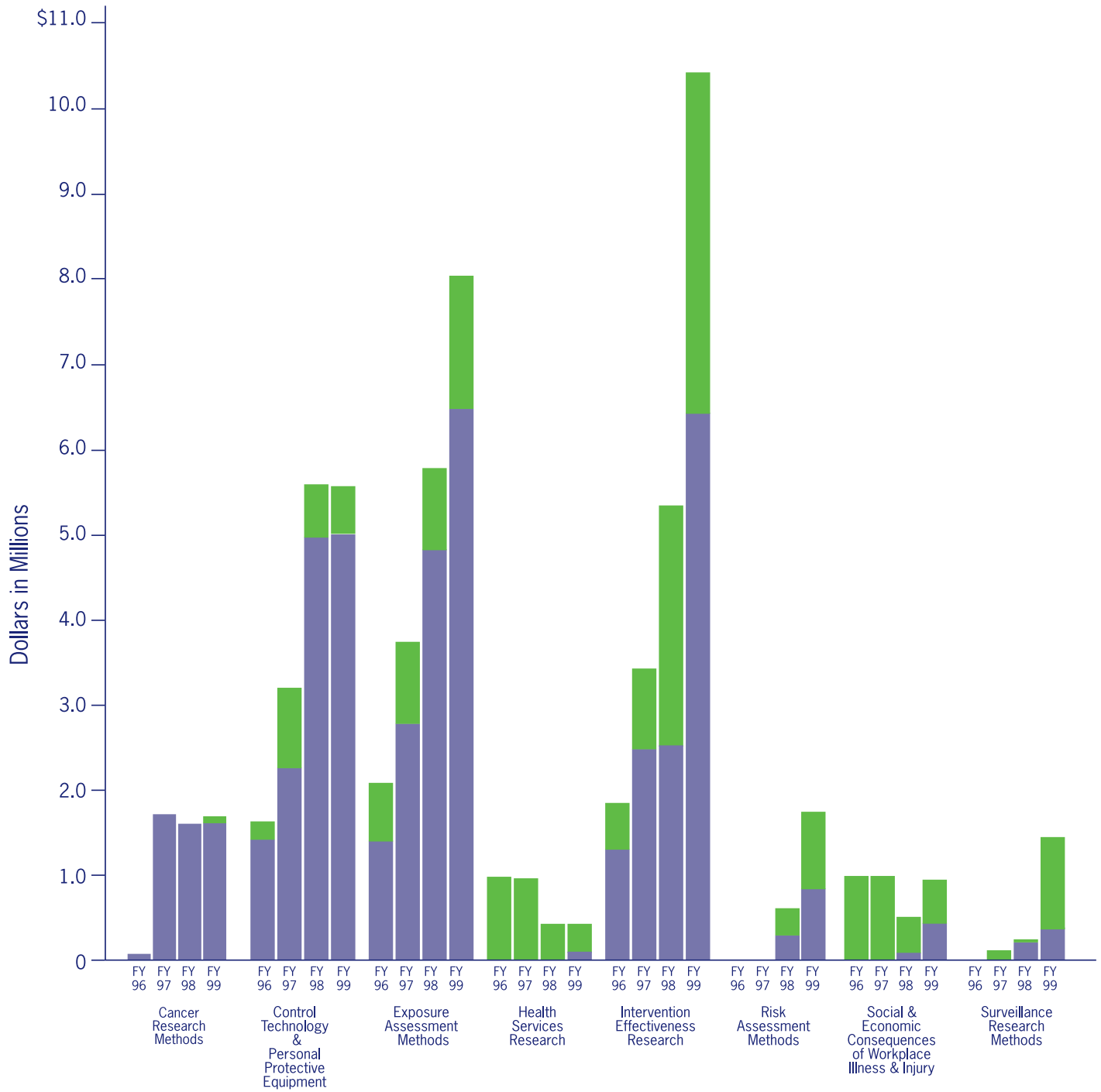
Disease and Injury



Work Environment and Workforce



Research Tools and Approaches



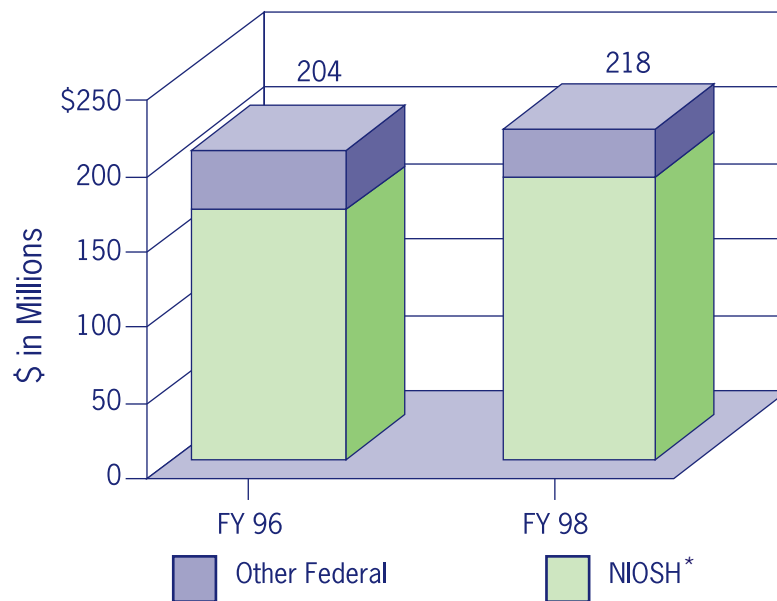
*FY99 numbers are estimates.

Other Federal Funding

As part of NORA, a survey of federal occupational safety and health research is conducted biennially. The first survey, covering FY 96, provided a baseline identifying a total of only \$39 million spent for all occupational safety and health research outside of NIOSH for a total federal investment of \$204 million. The same federal agencies and NIOSH reported spending \$210 million for all occupational safety and health research in FY 98. The second survey, covering FY 98, welcomed five new federal respondents. Even with the additional respondents, the total spending in occupational safety and health research by federal agencies in FY 98 was only \$218 million (NIOSH at \$187 million and other federal agencies at \$31 million).

The FY 96 baseline for NORA-related research from non-NIOSH federal sources was about \$15 million. The same respondents report having spent \$16.2 million on NORA-related research in FY 98. The new respondents bring the non-NIOSH federal total spent on NORA-related research in FY 98 to \$23.4 million.

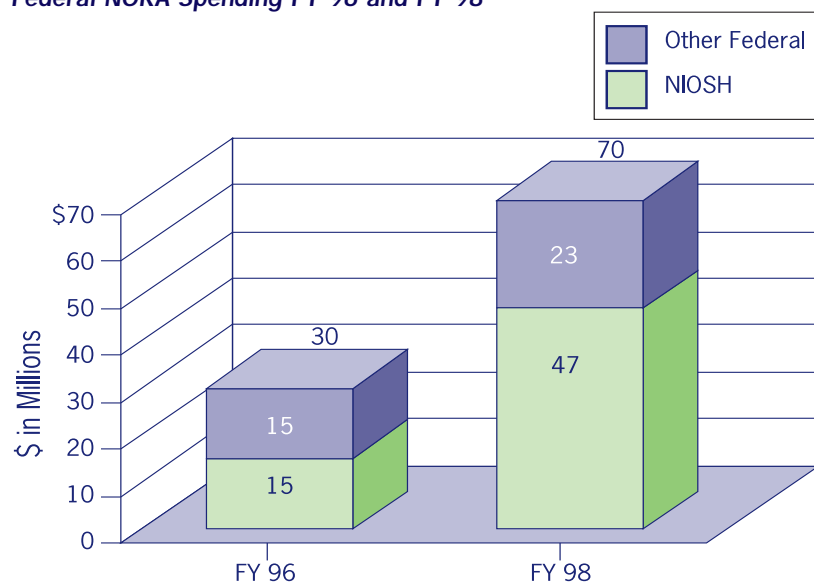
Federal OS&H Spending FY 96 and FY 98



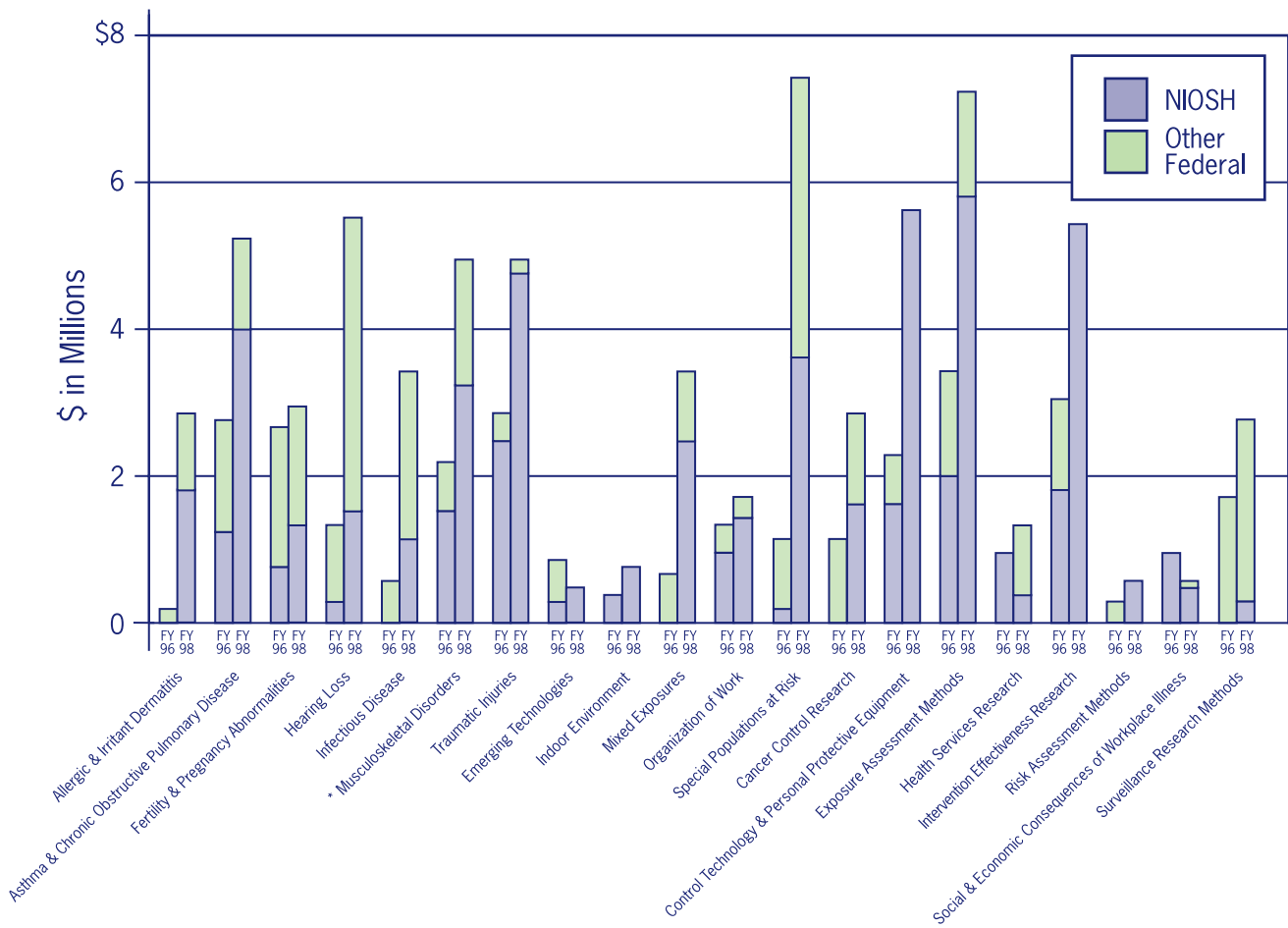
* For the purposes of this analysis, the total NIOSH budget is attributed to occupational safety and health research.

In FY 98 like FY 96, there is no reported spending in the priority area of Indoor Environment. There are reported decreases in spending by non-NIOSH federal agencies in some priority areas, e.g. Fertility & Pregnancy Abnormalities and Traumatic Injuries and increased spending is seen in others, e.g. Allergic & Irritant Dermatitis and Hearing Loss. In sum, there has been an increase overall at the federal level in NORA-related research, but this has in general come in redirection to rather than new resources in NORA priority areas. Federal partners will continue to perform the survey biennially, with the next survey assessing FY 2000 expenditures.

Federal NORA Spending FY 96 and FY 98



Federal NORA Spending by Priority Area



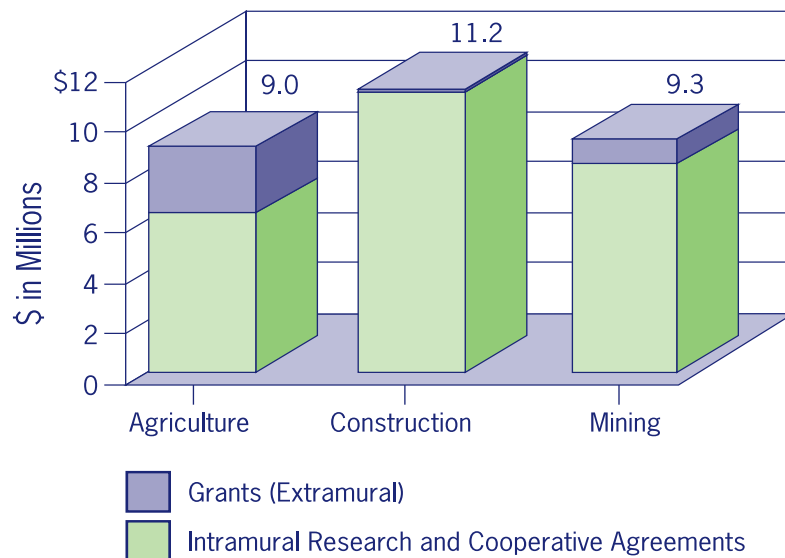
NORA Priority Areas

* Combines two NORA priority areas, Low Back Disorders and Musculoskeletal Disorders of the Upper Extremities

Sector-Specific Funding

During the development of the Agenda, the importance of sector-specific research was consistently raised. It was finally decided that the most effective way to integrate consideration of research efforts within specific sectors (such as construction, mining, and agriculture) was to apply a matrix approach of coordinated research in some or all of the 21 priority areas, as appropriate for each sector. As such, it is clear that NORA is having an impact on sector-focused research. In FY 99, within NIOSH, nearly \$30 million is being allocated to NORA research in agriculture (\$9 million), construction (\$11.2 million), and mining (\$9.3 million).

NORA Investments by Sector, FY 99*

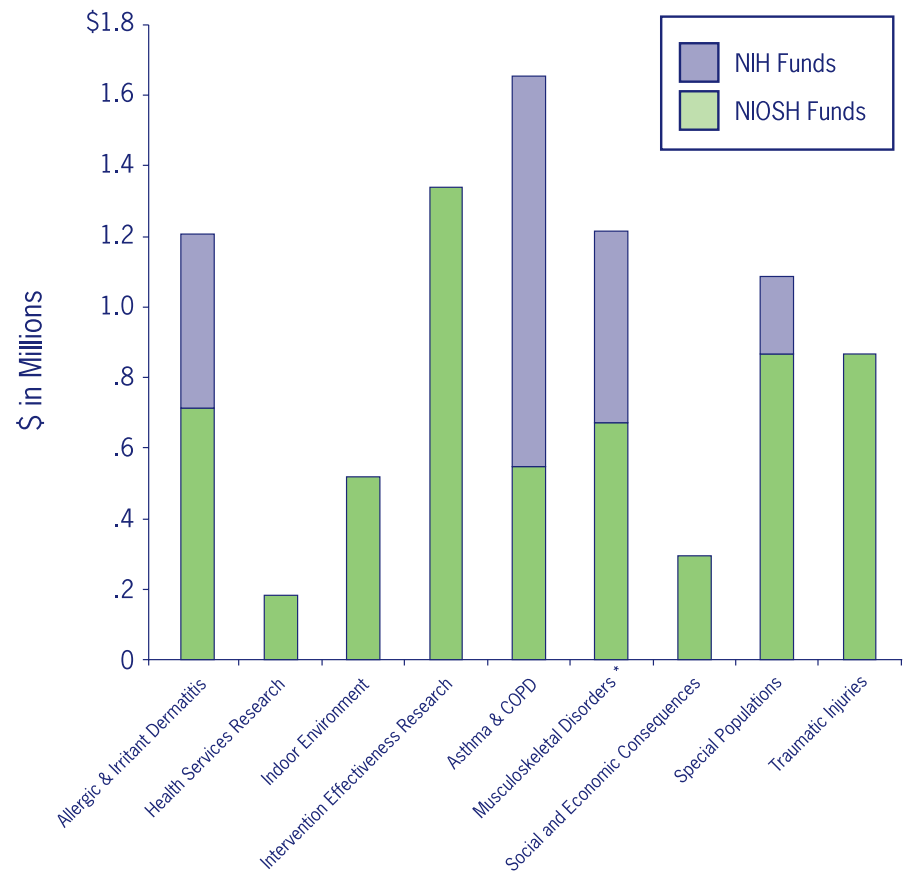


*FY99 numbers are estimates

NORA Grant Funding

NORA has been successful in stimulating new research needed to address the problem of workplace injury and illness. In October 1998, NIOSH and four federal partners awarded the largest infusion of funding ever by the federal government for extramural occupational safety and health research. NIOSH joined with the National Heart, Lung, and Blood Institute (NHLBI), the National Institute on Aging (NIA), the National Institute of Environmental Health Sciences (NIEHS), and the National Institute of Arthritis and Musculoskeletal and Skin Disorders (NIAMS) to award about \$8 million in grants in ten NORA priority research areas, with NIOSH awarding 38 grants related to the 1998 NORA Request for Announcements (RFA) and the partner NIH Institutes awarding 12 grants (see listing page 14).

FY 98 NORA Grant Awards



NORA Priority Areas

* Combines two NORA priority areas, Low Back Disorders and Musculoskeletal Disorders of the Upper Extremities

In 1999, NIOSH and six other federal agencies announced two new RFAs totaling at least \$9 million in nine priority research areas. In March 1999, NIOSH, in partnership with five other NIH Institutes, announced a new RFA to target grant funding in eight NORA priority research areas (committing to at least \$7.5 million in grant funds). The NIH cosponsors for this FY 99 NORA grants initiative are: the National Cancer Institute (NCI), NHLBI, NIA, the National Institute on Deafness and Other Communication Disorders (NIDCD), and NIEHS.

The NIOSH/NIH FY 99 Request for Applications (RFA) invites proposals for research related to:

- Intervention effectiveness research, i.e., evaluation of safety and health interventions to protect workers from job-related injuries and illnesses. Proposals can be in any industry sector, but NIOSH will give special consideration to projects in agriculture, construction, the service industry (especially health care), and mining.
- Fertility and pregnancy abnormalities associated with occupational exposures.
- Occupational hearing loss, specifically prevention and intervention, including noise control.
- Methodologies for assessing exposures to hazardous biological, chemical, and physical agents, including assessment of complex mixtures.
- Methodologies for injury and illness surveillance in the workplace.
- The aging workforce as a special population at risk of job-related injuries and illnesses.
- Asthma and chronic obstructive pulmonary disease.
- Issues in the organization of work relating to demanding work schedules, sleep disorders, and/or the risk of occupational illness and injury.

Three types of grants will be funded: (1) research project grants for projects designed to establish, discover, develop, elucidate, or confirm information relating to occupational safety and health; (2) demonstration project grants for projects designed to address the technical or economic feasibility of implementing a new or improved procedure, method, technique, or system for preventing occupational safety and health problems; and (3) pilot study grants for preliminary evaluation in developing the foundations for future, more comprehensive studies.

In April 1999, NIOSH, the Environmental Protection Agency, and the National Cancer Institute announced the availability of \$1.5 million for grant applications for research that focuses on the development of cancer risk assessment methods and practices. An emphasis is placed on the development of new methods and practices that reduce the uncertainties associated with cancer risk assessment, especially uncertainties that are encountered in extrapolating from animal species to humans. Studies that propose refinement, validation, or invalidation of existing methods and practices are also acceptable if they will result in a significant reduction in uncertainty.

NIOSH also committed additional resources in FY 99 to investigator-initiated awards in all 21 priority areas through its regular grants process. NORA is achieving its goals of improved partnership and increased research in the 21 priority research areas.

GRANTING PRACTICES

Grant Awards Related to the National Occupational Research Agenda (NORA) Grouped by NORA Priority Area

Allergic & Irritant Dermatitis

Role of Vernix as A Natural Biofilm and Epidermal Protectant
Children's Hospital Research Foundation
Cincinnati, Ohio

Prediction of Irritation Based on Exposure Duration
Wright State University

In Vitro Assay for Hapten-Specific Priming of Human T Lymphocytes
Schepens Eye Research Institute, Boston, Mass.

Genetic Fingerprints of Irritant Contact Dermatitis*
University of Texas

Effects of Irritants on Epidermal Antigen Presentation*
University of Rochester

Asthma & Chronic Obstructive Pulmonary Disease

A Novel Mouse Model of Isocyanate-Induced Asthma
Yale University

Respiratory Disease Among Sawmill Workers
University of British Columbia

Pulmonary Effects of Machining Fluid Aerosols
New York University Medical Center
Tuxedo, N.Y.

Estimation of Highest Task Silica Exposures
University of Cincinnati

Passive Sampler for Particles
The University of North Carolina at Chapel Hill

Development of New Personal Aerosol Samplers
University of Michigan

Isocyanate Antigens & T-Cells that Cause Asthma*
Yale University

Endotoxin and Bronchial Inflammation Asthma*
University of North Carolina

Isocyanate Dermal Exposures in Autobody Shops*
Johns Hopkins University

Host Determinants of Organic Dust-Induced Airway Disease*
University of Iowa

Cardiopulmonary Effects of Particulate Exposure*
Harvard University

A Community Based Study on Occupational Asthma* (Pending)
Utah Department of Health

Health Services Research

Evidence-Based Medical Examinations for Firefighters
Harvard University

Indoor Environment

Prevention of IEQ-Related Absence: An Intervention Study
Harvard University

Microanalytical System for Indoor VOC Monitoring
University of Michigan

Intervention Effectiveness Research

Organizational Predictors of Successful Return to Work
New England Medical Center, Boston, Mass.

ROPS Design and Testing for Agricultural Tractors
Colorado State University

Leadership Intervention for Fire Service Personnel
University of Washington.

A New Training Intervention to Prevent Back Injuries
Rush-Presbyterian-St. Luke's Medical Center, Chicago, Ill.

Work Organization and Depression Among Nursing Home Aides
University of West Virginia

Health & Safety-Pollution Prevention in Hospitals
University of Massachusetts Lowell

Field Study of Hearing Protector Evaluation Procedure
University of Arkansas

Getting to Zero in Nursing Homes: Intervention Effectiveness
Department of Labor and Industries
Olympia, Wash.

The Buffalo Police Health Study: A Baseline Evaluation
University of Buffalo

Musculoskeletal Disorders

An Intervention to Reduce Disability in Injured Workers
Barnes-Jewish Hospital, St. Louis, Mo.

Quantifying the Use of Keyboard/Mouse Through Intranet
University of California at Los Angeles

CTS Incidence & Correlates of Workers' Compensation Claims
University of Massachusetts Lowell

An Animal Model for Repetitive Finger Loading
University of California, Richmond
MSDs in Nurses: Organization and Physical Work Factors
University of Maryland, Baltimore

Gender Factors in Spinal Stability and Low-Back Injury*
University of Virginia

Experimental Induction of CTS*
University of California, San Francisco

Tolerance of Intervertebral Disc to Repetitive Compressive Loading*
University of California, San Francisco

Social and Economic Consequences of Workplace Illness & Injury

The Employment Impact of Workplace Injuries in 5 States
Boston University

Functional Limitation & Recovery from At-Work Injuries
University of California, San Francisco

Special Populations at Risk

Green Tobacco Sickness in Minority Farmworkers
The University of North Carolina at Chapel Hill

Collecting Elusive Data on Immigrant Occupational Health
University of Massachusetts, Lowell

Factors Affecting the Health of Employed Pregnant Women
University of Kentucky Research Foundation

Hispanics and Noise-Induced Hearing Loss
Yale University

Ergonomic Aspects of Older Workers' Postural Balance
University of Cincinnati

Farmwork and Preterm Low Birthweight Among Hispanic Women*
University of California, Davis

Traumatic Injuries

On-the-Job Injury in South Texas Middle School Children
The University of Texas

Etiology of Injury in Drywall and Residential Carpentry
Duke University

A Case Crossover Study of Occupational Hand Injuries
Harvard University

Impact of Time and SCBA Tank Utilization on Injury Prevention in Fire Fighters
Montefiore Medical Center, Bronx, N.Y.

Adolescent Toxic Exposures in the Workplace
Children's Hospital, Boston, Mass.

* Funded by NIH

Tracking Partnership Products

Requests for Applications (RFAs)

In FY 98, NIOSH and NIH awarded 50 grants totaling about \$8 million dollars in ten NORA priority research areas. A Request for Applications (RFA) for a second year of NORA grants funding was issued in March 1999 by NIOSH and NIH. The agencies expect to award at least \$7.5 million in grant funds in eight of the NORA priority research areas (total available funds under the RFA is \$22.5 million over three years). Also, in FY 99, NIOSH, the Environmental Protection Agency, and the National Cancer Institute announced the availability of \$1.5 million for grant applications for research that focuses on the development of cancer risk assessment methods and practices.

Team Products

In addition to leveraging resources, as mentioned above, partnership teams are an integral part of implementation. Team products are also being tracked as a measure of NORA's success. The teams have been very active. As expected, each team is proceeding somewhat differently. Many teams are writing white papers— documents that use variable approaches to advance issues in each priority area, such as summarizing the research in a priority area, defining gaps, and laying out opportunities for collaboration. In some areas, a well-defined research agenda currently exists (e.g. asthma) so a white paper was deemed not necessary. The following 16 NORA teams have completed or are currently working on white papers:

- Allergic and Irritant Dermatitis
- Cancer Research Methods
- Emerging Technologies
- Exposure Assessment Methods
- Fertility and Pregnancy Abnormalities
- Health Services Research
- Hearing Loss
- Infectious Diseases
- Indoor Environment
- Intervention Effectiveness Research
- Mixed Exposures
- Musculoskeletal Disorders
- Organization of Work
- Social and Economic Consequences of Workplace Illness and Injury
- Surveillance Research Methods
- Traumatic Injuries

Partnership Team activity can also be measured through conferences and workshops. From September 1996 through June 1999, NIOSH and its partners have sponsored 20 major meetings related to NORA as a whole or to specific priority areas (one in 1996, four in 1997, ten in 1998 and five scheduled through June 1999). A list of the NORA meetings follows. In addition to white papers, conferences, and workshops, teams are also developing surveys, establishing graduate-level training programs, participating in continuing medical education workshops, and developing documents.

NORA Meetings, September 1996 through June 1999

Workplace-Related Skin Diseases and Exposure Assessment Workshop	September 25-26, 1996
Pneumonitis in the Machining Environment Workshop	January 28-29, 1997
Latex Allergy Conference	March 1997
National Occupational Research Agenda Symposium	July 1, 1997
National Occupational Injury Research Symposium	October 15-17, 1997
1998 Applied Workshop on Occupational and Environmental Exposure Assessment	February 23-25, 1998
Control of Workplace Hazards for the 21st Century	March 10-12, 1998
Three Musculoskeletal Meetings to Set a Research Agenda	March 25, 1998 - Chicago, IL April 20, 1998 - Seattle, WA April 27, 1998 - Washington, DC
Round Table Discussion on the Organization of Work at the Society for Industrial and Organizational Psychology Conference	April 24-26, 1998
Occupational Asthma: In and Out of the Workplace	April 30-May 2, 1998
Natural Rubber/Latex Allergy: Recognition, Treatment, and Prevention, Satellite Downlink Teleconference	May 5, 1998
Hazardous Substances and Male Reproductive Health	May 14-15, 1998
Research Workshop on the Risks and Benefits of Exposure to Ultraviolet Radiation and Tanning	September 16-18, 1998
Developing a National Occupational Research Agenda for Prevention of Musculoskeletal Disorders	March 8, 1999
Work, Stress, and Health 99: Organization of Work in a Global Economy	March 11-13, 1999
NORA Symposium 1999: Partnership for Research	May 14, 1999
Experimental Contact Dermatitis Research Group Meeting	May 21-22, 1999
Functional, Economic, and Social Outcomes of Occupational Injuries and Illnesses: Integrating Social, Economic, and Health Services Research	June 13-15, 1999

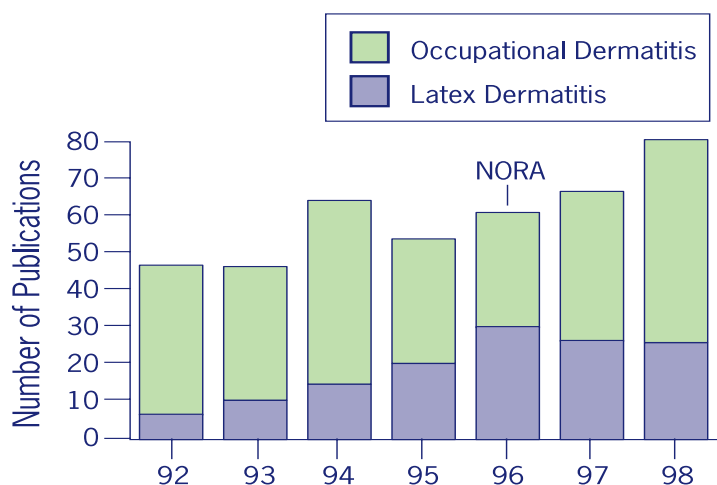
Tracking the Literature and Recognition of NORA

Bibliometrics

One measure of whether NORA is having the intended effect of stimulating increased research in the priority areas is tracking scientific literature over time or bibliometrics. To aid in this effort, in October 1998, NIOSH held a bibliometrics workshop to discuss appropriate measures for tracking the impact of NORA that included using bibliometrics and citation mapping. NIOSH is actively tracking articles in all 21 priority research areas published from 1992 through 1996 (baseline) and in subsequent years. Since there is a delay between the completion of research and its publication in the scientific press, the full impact of NORA on scientific publications may not be seen for several years.

One example of identifying baseline activity is in the priority area Allergic and Irritant Dermatitis. In the five years prior to announcing NORA, 1992-1996, the overall number of peer-reviewed publications has varied between 45 and 65, with a steady increase (from 7 to 30) in the subset dealing with latex dermatitis. This pattern will be tracked in future years, including citations to NORA and NORA funding, to assess the possible impact of NORA on research activity in this area.

Occupational Dermatitis Publications



Surveys of NORA Effectiveness

Measuring the amount of money allocated to NORA priority research areas is only one way to gauge the effectiveness of NORA. The NORA Liaison Committee has administered a survey to help determine the recognition and impact of NORA. The Liaison Committee distributed its survey to key associations and professional organizations. A report of survey results will be provided at the NORA Symposium 1999 and will be available on the NORA webpage at <http://www.cdc.gov/niosh/norahmpg.html>. The survey will be administered periodically by the Liaison Committee to gauge the recognition and influence of NORA over time.

In an attempt to better understand the level and types of safety and health research currently being performed in private industry, as well as to get a sense of industry awareness of NORA, Organization Resources Counselors, Inc., has circulated a survey to its Occupational Safety and Health Group, which consists of over 125 of America's largest corporations in a wide variety of industry sectors. Survey results will be available in 1999.

Other Tracking Methods

In addition to scientific publications, NIOSH is tracking popular literature citations, trade journal and media references and "hits" on the NORA homepage to assess the diffusion of NORA. The NORA web site has received over 90,000 hits in the nine month period from May 1998 (the date the NORA site was loaded) through February 1999 (the last month for which data are available). The NORA web site contains all NORA documents, white papers, research summaries, NORA grants information, a calendar of upcoming events, and partnership team information.

Many teams are using the NORA web site to enhance their communication efforts. Some teams have also established listservers to communicate among researchers interested in specific priority research areas. The quarterly NORA newsletter, entitled *NORA News*, has also helped improve NORA communication. Another communications effort, a compendium of NIOSH-conducted or -funded NORA research is expected in 1999.

Partnership

NORA Partnerships

NORA has helped demonstrate that there is a new way of doing business at NIOSH. Although the transformation to the “new NIOSH” was in process prior to NORA, the development and implementation of the Agenda has proven to many in the private sector that collaboration with the government is not only possible, but worthwhile.

Research related to the Traumatic Injury Team has proven particularly fruitful. The Traumatic Injury Team document, *Traumatic Occupational Injury Research Needs and Priorities*, will help pave the way for future partnerships. The document provides a foundation for discussion with external partners to explore common research areas. In the first three examples below, industry approached NIOSH to collaborate on topics related to the traumatic injury priority research area. All of the following partnership success stories demonstrate the benefits of partnership for the improved safety and health of workers. In each, NIOSH provides its scientific expertise and creative problem-solving skills and the partners provide the “laboratories” for evaluating interventions in real work settings.

Wal-Mart

The effectiveness of back belts has been questioned in recent years. In 1994, NIOSH released a report stating that there is inadequate scientific evidence that back belts actually reduce the risk of back injury. The statement reflected concerns that many employers were providing (and often requiring) back belts as the only method to prevent back injury. In what promises to be the most definitive research study to date, NIOSH teamed with Wal-Mart to determine the efficacy of back-supporting belts in preventing first and recurrent low back injuries. Approximately 8,000 retail merchandise employees at 160 stores are being followed for two years to determine if low back injury rates in individuals wearing belts are different from rates in individuals not wearing belts. Results of the study will be reported in 1999.

Barnes Jewish Christian (BJC) Health System

Back injuries are one of the most common injuries among nursing home employees. Barnes Jewish Christian (BJC) Health System designed and implemented a “best practices” system, and approached NIOSH for help in scientific evaluation of the program as implemented in Illinois and Missouri. NIOSH and BJC will evaluate the efficacy of a “best practices” program in reducing the incidence and cost of back injury among nursing home workers. The “best practices” program includes: specialized, state of the art lifting equipment, training in lifting techniques, accident investigation, and medical management of injured workers.

Anthony Crane Rental

Crane operators, on-site workers, and the general public are at risk of serious and possibly fatal injury due to incidents involving cranes or hoists. In 1994, incidents involving cranes resulted in 88 fatalities. Damage to property can be extremely costly. Anthony Crane Rental (ACR) is the largest crane rental company in the U.S. and employs 800 crane operators. ACR and the International Union of Operating Engineers share the responsibility of certification of crane operators. NIOSH and ACR will collaborate to evaluate data on crane-related incidents in order to determine whether operator certification is effective in preventing crane-related injuries. The results will help industry, labor, and the public, as well as assisting OSHA in determining the value of mandatory certification.

Navistar, UAW, Aetna US Healthcare

NIOSH is working with Navistar International Transportation, the United Auto Workers, and Aetna US Healthcare to evaluate the results of expanding workplace-based occupational safety and health programs to include general health care. This study will assess the impact of this intervention on health care status, utilization and costs, and worker productivity.

Asphalt Partnership

In order to reduce worker exposure to asphalt fumes during paving operations, NIOSH formed a collaborative partnership with government, industry, and labor. The partnership developed a comprehensive engineering control strategy to reduce exposures to asphalt fumes during paving operations. The engineering control is a ventilation system attached to the paver that reduces fume and heat before they can reach the worker. As a result, as of July 1, 1997, all highway paving machines now have this effective control technology. This very successful program was a finalist in the prestigious Innovations in American Government Award Program in 1998. The broad-based network of partnerships created by NORA has helped foster these continuing and evolving efforts. As such, it is only fitting that this project received the first NORA Partnership Award.

Department of Veterans Affairs

The Veterans Health Administration (VHA) within the Department of Veterans Affairs (DVA) employs one of the largest groups of healthcare workers in the U.S. There were 223,602 employees in the VHA as of November 1997. In October 1998, a Memorandum of Understanding (MOU) was signed by NIOSH and the DVA formally establishing a research partnership combining NIOSH's research capabilities and the DVA's large health care organization. This unique partnership will make the DVA facilities available to NIOSH for many types of health care research, and will ultimately lead to better understanding of prevention interventions for health care workers. Initially, the partnership is supporting a joint study on latex allergy which will provide NIOSH with new insights into developing more effective recommendations to protect workers, and will provide the DVA with an accurate estimate of the extent of latex sensitization among its employees. Effectiveness of preventive intervention activities will also be studied. The partnership directly relates to the Health Services Research, Asthma and COPD, and Allergic and Irritant Dermatitis priority research areas.

NORA - A Model for Partnership

One of the most encouraging testaments to the success of NORA is the number of other organizations using NORA as a model for creating research agendas or other types of partnership and planning. NORA has generated tremendous interest— especially at the federal level— because of its innovative approach to strategic planning. NIOSH has shared its experience with many who have sought to undertake a similar effort. Examples of such planning efforts follow. The first five summaries are new additions to this comprehensive listing.

- The **Japanese National Institute of Industrial Health** is using NORA as a model as the Institute moves forward with the development of a national occupational health research plan for Japan. Development of the plan was mandated in 1998 by the Ministry of Labor of Japan and, like the NORA process, will involve the cooperation of several government agencies and health and safety research organizations.
- The **European Agency for Safety and Health at Work** is undertaking a planning effort in the European Union, using NORA as a model.
- The **Department of Defense** used NORA in developing its Deployment Toxicology Research and Development Master Plan, “Protecting the Fighting Force”.
- CDC’s **National Center for Health Statistics** and the **National Committee on Vital and Health Statistics** are undertaking a planning process and using NORA as a model for outreach to stakeholders.
- CDC’s **National Center for Injury Prevention and Control** is exploring the use of NORA as a model to develop their National Research Agenda for Injury Prevention and Control.
- **Istituto Superiore Per La Prevenzione E La S Curezza Del Lavoro** (the Italian Institute for Occupational Safety and Health) is undertaking a priority-setting effort in Italy, using NORA as a model.
- The **Norwegian National Institute of Occupational Health** is conducting a priority setting process based, in part, on NORA.
- The **Environmental Protection Agency** is considering using NORA as a guide for the Human Health Indoors Project to explore how the EPA should protect human health indoors in the 21st century.
- **Washington State** is undertaking a state-wide needs and priorities planning process for health and safety much influenced by the NORA process.
- The **Pacific Northwest Agricultural Safety and Health Center** organized a farm summit modeled after NORA to develop areas of consensus about key agricultural safety and health problems that can be addressed by research and intervention programs.
- The **Chemical Safety and Hazard Investigation Board** is using NORA as a model to develop its own priorities.

PARTNERSHIP

- The **American Association of Occupational Health Nurses (AAOHN)** and the **American College of Occupational and Environmental Medicine (ACOEM)** established a joint research award. As stated by the AAOHN Executive Director, “In support of the work of NIOSH and to promote the National Occupational Research Agenda (NORA), emphasis has been give to NORA in the selection criteria.”
- The **Chemical Industry Institute of Toxicology, the Chemical Manufacturers Association**, and other organizations undertook a prioritization activity using some strategies of NORA development. Eight of the topics identified in their process closely relate to NORA priority areas.

NORA Partnership Award

NIOSH announced the first *NORA Partnership Award For Worker Health and Safety* at the 1999 NORA Symposium at the National Academy of Sciences in Washington, D.C. The award recognizes outstanding NORA partnership activities that lead to improved worker health and safety. To be eligible for the award, NORA partnership activities must include collaborative research in at least one NORA priority area that results in the development of interventions that reduce hazardous exposures or adverse outcomes. Partners should represent a broad and diverse spectrum of organizations and individuals, such as manufacturers, end-users, labor, the public health community, academia, and government.

The 1999 winner of the *NORA Partnering Award For Worker Health and Safety* is the Asphalt partnership. This unique collaboration brought together diverse partners to achieve the goal of reducing workers' exposure to asphalt fumes during highway paving. The partners included NIOSH, the National Asphalt Pavement Association, the Federal Highway Administration, the Occupational Safety and Health Administration, the International Union of Operating Engineers, the Laborers' Health and Safety Fund of North America, the Laborers' International Union of North America, and the Asphalt Institute. Through use of innovative engineering controls, the partners achieved an unprecedented accomplishment — 100 percent of an industry voluntarily agreeing to implement control technology equipment (which reduces worker fume exposure by about 80 percent) on all new highway pavers produced after July 1997.

The partnership formed amid ongoing controversies surrounding the health effects of asphalt fume exposures and possible regulatory activity aimed at reducing these exposures. Working together, the partners avoided the protracted regulatory process and ensured that effective control technologies, designed and evaluated by NIOSH and its partners, were implemented to protect the approximately 300,000 highway paving workers across the nation.

This unique partnership was also selected as one of 25 finalists (out of 1,420 applicants) in the 1998 Innovations in American Government Awards Competition sponsored by the Ford Foundation, the John F. Kennedy School of Government at Harvard University, and the Council for Excellence in Government. The prestigious Innovations Award recognizes excellence in government and celebrates outstanding examples of creative problem-solving in the public sector.

Guiding NORA Implementation

Liaison Committee

The NORA Liaison Committee, chaired by Dr. Bonnie Rogers (American Association of Occupational Health Nurses), consists of 23 members representing industry, labor, academia, professional organizations, and government (see listing on page 2). The Liaison Committee's role is to provide outreach and commentary on the development, progress, and direction of NORA implementation.

The Measures and Goals Subcommittee (chaired by William Bunn, Vice President, Health, Safety and Productivity, Navistar International Transportation Corporation of Navistar) is helping to guide the tracking of NORA's progress. The Liaison Committee has devised a survey to determine the recognition and influence of NORA. The survey was distributed by members of the Committee (independent of NIOSH) to many associations and professional organizations. The results of the survey will be presented at the NORA Symposium 1999 and will be available on the NORA web page at <http://www.cdc.gov/niosh/norahmpg.html>.

In an attempt to better understand the level and types of safety and health research currently being performed in private industry, as well as to get a sense of industry awareness of NORA, Liaison Committee member Frank White, Vice President, Organization Resources Counselors, Inc. (ORC), has coordinated a survey of ORC's Occupational Safety and Health Group, which consists of over 125 of America's largest corporations in a wide variety of industry sectors. The results of this survey will be available in mid-1999.

Federal Liaison Committee

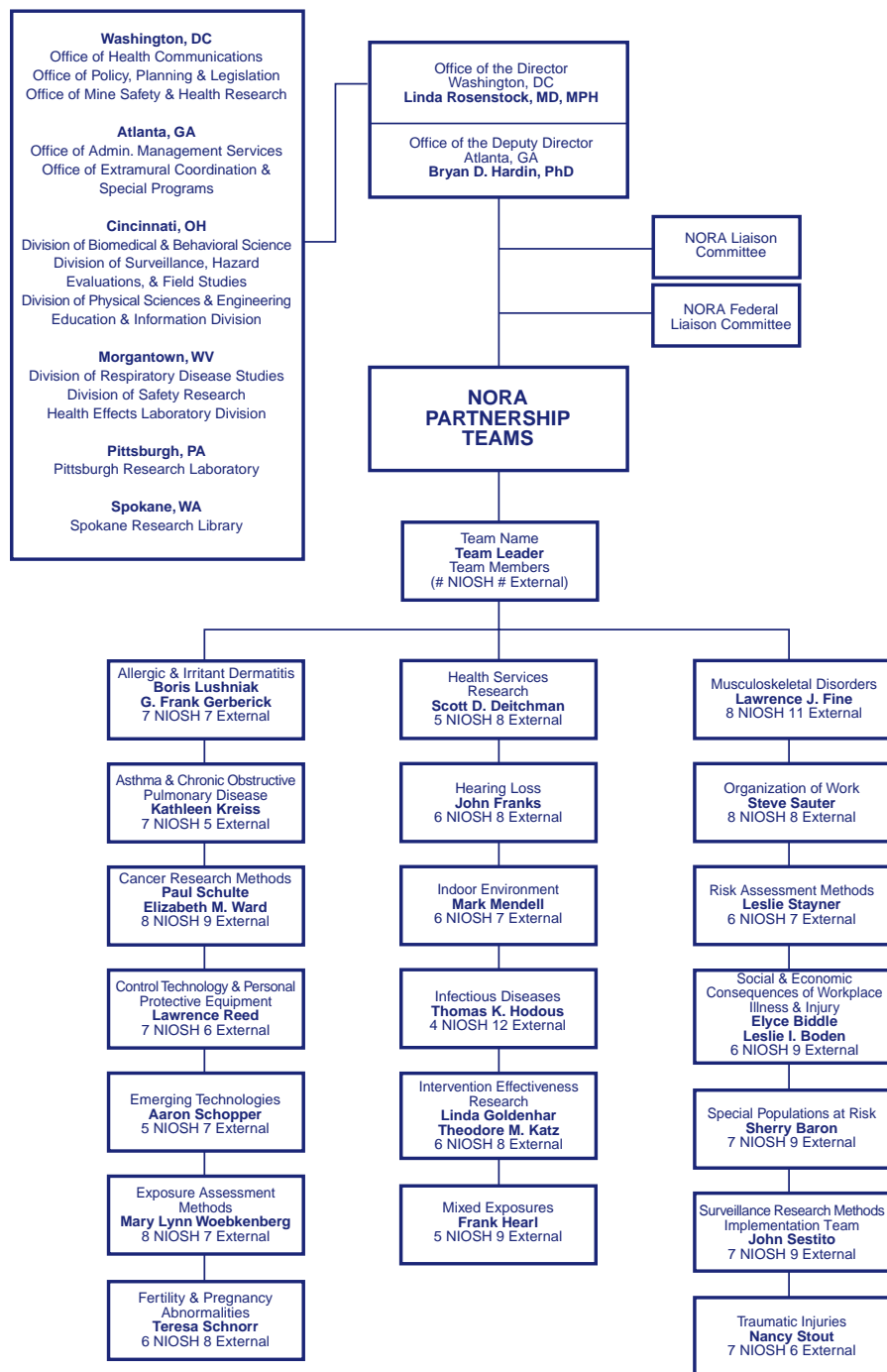
The Federal Liaison Committee (see listing on next page) is an active interagency working group guiding the implementation of NORA. This year the Committee undertook the second biennial survey of federal investment in NORA and in occupational safety and health research overall. The first survey, covering FY 96, provided a baseline identifying a total of only \$204 million spent for all occupational safety and health research from the survey respondents (including NIOSH) compared to \$218 million in FY 98. Although the overall increase in spending was not large, there was a substantial increase in spending in NORA priority areas, from \$30 million in FY 96 to \$70 million in FY 98.

Members of the Federal Liaison Committee have also been active in leveraging additional resources for NORA. In March 1999, NIOSH, in partnership with five other federal agencies, announced the second consecutive year of grant funding in the NORA priority research areas (see description on page 12).

Federal Liaison Committee

FEDERAL AGENCY	OFFICE/INSTITUTE/DIVISION
Consumer Product Safety Commission	
Department of Agriculture	Cooperative State Research, Education and Extension Service
Department of Defense	
Department of Energy	Office of the Environment, Safety and Health
Department of Health and Human Services	Agency for Health Care Policy and Research Agency for Toxic Substances and Disease Registry Centers for Disease Control and Prevention Epidemiology Program Office National Center for Chronic Disease Prevention and Health Promotion National Center for Environmental Health National Center for Health Statistics National Center for HIV, STD, and TB Prevention National Center for Infectious Diseases National Center for Injury Prevention and Control National Immunization Program Office of Minority Health Office of Women's Health Food and Drug Administration Intergovernmental Affairs National Institutes of Health Fogarty International Center National Cancer Institute National Heart, Lung, and Blood Institute National Institute on Aging National Institute of Allergy and Infectious Diseases National Institute of Arthritis and Musculoskeletal and Skin Diseases National Institute on Deafness and Other Communication Disorders National Institute of Environmental Health Sciences National Institute of Mental Health National Institute of Neurological Disorders and Stroke National Institute of Nursing Research Office of Women's Health Substance Abuse and Mental Health Services Administration
Department of Justice	National Institute of Justice
Department of Labor	Bureau of Labor Statistics Mine Safety and Health Administration Occupational Safety and Health Administration Wage and Hour Division
Department of Transportation	Federal Aviation Administration Federal Highway Administration National Highway Traffic Safety Administration
Environmental Protection Agency	National Exposure Research Laboratory Office of Prevention, Pesticides, and Toxic Substances
Department of Veterans Affairs	

NIOSH/NORA Partnership Structure



IMPLEMENTATION

Partnership Teams

Fundamental to the contributions of NORA is the success of the Partnership Teams. The Teams' ability to involve key stakeholders in the priority areas, define research needs, and leverage resources for research are critical to the implementation of the Agenda.

Each team consists of a team leader, NIOSH researchers, and external partners. The 20 partnership teams have brought together 130 NIOSH researchers and 160 external members (see inside front and back covers for team membership). External membership includes faculty from public and private colleges and universities, representatives of professional organizations and major industries, leaders in the insurance industry, health and safety professionals from organized labor, and representatives from other government agencies. The following summaries highlight the work of each of the 20 NORA Partnership Teams.

Team Summaries

Allergic and Irritant Dermatitis Team

The Allergic and Irritant Dermatitis (AID) Team mission is to develop a broad-based, active, and lasting group to catalyze research in AID. To date, AID Team accomplishments include: organizing and co-sponsoring meetings within the occupational safety and health and dermatology community; enhancing dermatology-related activities through both intramural and extramural research; and developing research priorities. In September 1998, the team cosponsored the "Workshop on Health Effects and Benefits of UV Radiation and Tanning" with the National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS), NIOSH, and others. The Experimental Contact Dermatitis Research Group, sponsored by NORA AID Team/NIOSH, the Skin Disease Research Centers at the University of Texas Southwestern Medical Center, Case Western Reserve University/University Hospitals of Cleveland, and the Procter & Gamble Company will convene in Cincinnati May 20-21, 1999. The purpose of this meeting is to discuss the basic and applied science of experimental contact dermatitis. In FY 98, NIOSH and NIAMS co-funded an RFA for irritant dermatitis and funded five dermatitis projects. Additionally, the team has been working on developing research priorities in AID (now available in draft form).

Asthma & Chronic Obstructive Pulmonary Disease Team

The Asthma and Chronic Obstructive Pulmonary Disease Team has concentrated its efforts on partnerships with federal agencies to increase resources available for research on occupational asthma and chronic obstructive pulmonary disease (COPD). For the extramural research community, the NIOSH partnership with the National Heart, Lung, and Blood Institute has resulted in requests for applications in both 1998 and 1999. In addition, NIOSH partnered with the CDC's National Center for Environmental Health and the Agency for Toxic Substances and Disease Registry to fund two cooperative agreements to ascertain the population-based proportion of incident asthma cases attributable to occupational exposures. Intramural NIOSH research has benefitted from partnerships with the Veterans Administration and the National Toxicology Program on latex asthma. The team hosted an international symposium on asthma last spring, has stimulated two *ad hoc* subcommittees of the American Thoracic Society to prepare published statements on occupational asthma and COPD, and is developing program initiatives on asthma prevention and building-related asthma (a cross-cutting priority of the Indoor Environmental Quality NORA team).

Cancer Research Methods Team

The NORA Cancer Research Methods Team has been reviewing methodologies that can have an impact on occupational cancer research. These methodologies range from the microlevel (such as structure-activity relationships to predict carcinogens) to the macrolevel (such as improvements in exposure assessments in epidemiological studies). The team is planning to publish a white paper on research needs and gaps for cancer research methods.

Control Technology and Personal Protective Equipment Team

In combination with the American Industrial Hygiene Association and the American Society of Safety Engineers, the team held a unique conference, "The Control of Workplace Hazards for the 21st Century: Setting the Research Agenda," in Chicago in March 1998. It brought together over 250 researchers, manufacturers, and users of engineering controls and personal protective equipment. At the conference, the participants set future directions for control technology research. Six priorities for research were identified: chemical protective clothing, engineering controls, noise, non-ionizing radiation, respirators, and traumatic injuries.

Emerging Technologies Team

The NORA Emerging Technologies Team is working on the team's three focus areas: 1) establishing mechanisms to ensure that worker health and safety is considered when new technologies are developed and implemented; 2) surveillance systems for tracking the impact of new technology on worker safety and health; and 3) technology transfer of safety and health controls and innovations from one industrial sector to another. In March 1998, team members participated in each of the six breakout sessions held during the "Control of Workplace Hazards for the 21st Century: Setting the Research Agenda" workshop in Chicago. The team is currently considering a pilot project, in conjunction with the EPA, to incorporate occupational safety and health considerations into a new or revised technology which will serve as a model for use by others.

Exposure Assessment Methods Team

The Exposure Assessment Methods Team is composed of 14 members representing various disciplines (e.g., chemistry, biology, industrial hygiene, occupational health nursing, toxicology, and epidemiology) from government, academia, labor, and industry. The team is involved in symposia with the American Conference of Government Industrial Hygienists, National Institute of Environmental Health Sciences/National Toxicology Program, and the International Symposium on Occupational Exposure Data Bases and Their Application in the Next Millennium. The team is in the process of developing a white paper describing research that addresses key exposure assessment issues such as field study design, monitoring methods development, and toxicology research, along with needs in education and publications relative to exposure assessment.

Fertility and Pregnancy Abnormalities Team

The mission of the Fertility and Pregnancy Abnormalities Team is to assist in the development and pursuit of reproductive health research. One of the team's goals is to increase public awareness and understanding of known reproductive hazards. To do this, the team is using the NORA web page, the NTP/NIEHS Center web page, and pamphlets published by NIOSH. The team helped organize the conference, "Hazardous Substances and Male Reproductive Health," held in May 1998 in New York. The conference was sponsored by Mount Sinai School of Medicine, NIEHS, NIOSH, and the New York Academy of Medicine. The team is also developing a paper on current research needs in the field of occupational reproductive health to help encourage research in areas that are most in need. NIOSH and NIEHS are cosponsoring the 1999 RFA which includes fertility and pregnancy abnormalities as a targeted research area. A workshop is planned for the Fall of 1999 to discuss ways to bridge the different methodological approaches used by epidemiologists and toxicologists such as sample size issues, statistical analysis methods, and presentation of results.

Health Services Research Team

The Health Services Research Team seeks to define and promote research into the delivery of health care to workers. The team has been active in planning the upcoming conference, "Functional, Economic, and Social Outcomes of Occupational Injuries and Illnesses: Integrating Social, Economic, and Health Services Research," to be held June 13-15, 1999, in Denver, Colorado. This conference will bring together researchers from both the Health Services Research and Social and Economic Consequences NORA teams, and will be used to create position papers for each topic. Team members also participated in a health services research meeting sponsored by the Robert Wood Johnson Foundation Workers' Compensation Health Initiative on September 15 and 16, 1998 which will be summarized in published conference proceedings. Team members are also participating in a research project funded by the Robert Wood Johnson Foundation to create performance measures for occupational health services provided in managed care. Several research papers from this project have been drafted for submission to peer-reviewed journals. New research partnerships are being explored with major industrial employers.

Hearing Loss Team

The Hearing Loss Team is writing a white paper on occupational hearing loss, developing a proposed model curricula for graduate students in Audiology and Industrial Hygiene, and will compile documents based on best practices workshops planned by the team. The first of these conferences, "Best Practices for Hearing Loss Prevention," will be held on October 28, 1999, in Detroit, Michigan. Cosponsors of the conference include: NIOSH, the National Hearing Conservation Association, the National Safety Council, the American Hygiene Association, the Michigan Industrial Hygiene Association, the Institute for Noise Control Engineering, and the Douglas A. Fraser Center for Workplace Issues at Wayne State University. The team is also working with the NIOSH Office of Health Communication on a research-based communication activity which will provide important hearing loss prevention messages to health professionals, employers, and workers.

Indoor Environment Team

The Indoor Environment Team has generated a priority research agenda for improving the health of workers in indoor environments, reflecting available information on public health and economic impacts of building-related health effects. Inclusion of a draft version of this research agenda in the NIOSH 1998 RFA stimulated generation of 24 grant applications in this research area, of which NIOSH was able to fund two: a blinded, controlled intervention study of the effects on illness absence and respiratory illness of ventilation rate and building humidification, using a polymerase chain reaction assay to diagnose specific strains of respiratory infection; and the development of a hand-held microanalytical system to identify and quantify low concentrations of mixed volatile organic compounds in indoor environments.

Infectious Diseases Team

The mission of the Infectious Diseases Team (ID) is to review and recommend needed changes in occupational infectious diseases research efforts, facilitate the development of new research and collaboration in this area, call attention to the national needs in occupational infectious diseases research, and help in the greater dissemination of research data in the field. To this end, the team has developed a draft white paper addressing major research needs, particularly those involving human-to-human transmission. Team members are working with NIOSH and other CDC staff to help develop and to review an Alert on needle-stick injuries. The team has also discussed possible collaboration with the NORA Indoor Environment team on research addressing the hazards of common infectious diseases in office workers. Particularly with several new team members, we will reexamine occupational infectious disease activities and needs and our draft white paper during our face-to-face meeting at the NORA Symposium in May, 1999.

Intervention Effectiveness Research Team

The NORA Intervention Effectiveness Research (IER) Team has been active in carrying out the team's mission to: 1) encourage more testing of interventions to improve health and safety in the workplace; 2) improve evaluation (measurement, analysis, and documentation) of intervention efforts; 3) make intervention evaluation more accessible to researchers, health and safety professionals, labor, and management, by promoting the development of practical tools and approaches; and 4) broaden dissemination of results and lessons learned from occupational safety and health intervention research. The team developed a theoretical model to help clarify the major steps and activities involved in an intervention effectiveness study, which will be described in a white paper that is in preparation. IER has also developed a case-based workshop exercise to give health and safety professionals hands-on experience at developing and evaluating a specific intervention. The team is working with the Institute of Labor and Health in Toronto, Canada, to prepare an intervention evaluation manual for professionals, and is also developing an employer-friendly practical manual for evaluating occupational safety and health interventions in the workplace.

Mixed Exposures Team

The NORA Mixed Exposures Team is developing a white paper that defines the topic of mixed exposures, reviews the recent and past literature, and describes on-going work both nationally and internationally. Combined with an assessment of the regulatory needs for controlling mixed exposures, the team will produce a document describing a research agenda. The Mixed Exposure Team is examining mixtures from the perspective of: complex mixtures (like combustion exhausts), mixtures with identifiable composition, mixed stressor exposures (such as noise and chemicals), and mixtures associated with particular workplaces or processes (like coal mine dust). The team is attempting to facilitate communications and collaboration among researchers and those interested in mixed exposures through a Listserver and a site on the Internet. Instructions for joining the Listserver are provided on the Internet site at: <http://www.cdc.gov/niosh/mixed.html>.

Musculoskeletal Disorders Team

The Musculoskeletal Disorders Team is engaged in developing a National Occupational Research Agenda on Work-Related Musculoskeletal Disorders. In 1998, the first step in the process was a series of three workshops in Washington, D.C., Chicago, Illinois, and Seattle, Washington, where over 150 practitioners (ergonomists, occupational physicians, and others) used their experience to identify gaps in existing knowledge and determine what should be included in a national research agenda. In 1998 and 1999, the NORA team developed a draft summary of research ideas in the areas of surveillance, etiological research, and intervention research. This document was discussed in a fourth workshop of fifty academicians in March 1999. The team plans to use this input to develop the final research agenda.

Organization of Work Team

Since 1998, the Organization of Work Team has met on a monthly basis to consider the changing nature of work, potential health and safety risks, and prevention strategies. To better understand knowledge gaps and research needs in these areas, an outreach workshop with key interest groups was held on March 9 and 10, 1999 in Baltimore, MD. Team members met with over 30 representatives from national and international stakeholder organizations, including universities, labor and management organizations, government agencies, and professional associations. The meeting consisted of structured activities and plenary sessions designed to elicit stakeholder viewpoints on three broad topics: 1) how the organization of work is changing, 2) safety and health implications of these changes, and 3) interventions for reducing health and safety risks. Information from this meeting is being integrated into a strategic report on research needs in work organization and health.

The team also sponsored with the American Psychological Association a major scientific meeting on work organization and health March 11-13, 1999, in Baltimore. A substantial proportion of the papers came from international contributors, including scientists from Asia, Europe, Canada, and South America. One of the poster sessions featured presentations by five different NORA teams. Finally, members of the team have met with interest groups such as the Academy of Management and the National Advisory Committee on Occupational Safety and Health to describe the teams' activities and to seek input and collaboration.

Risk Assessment Methods Team

The Risk Assessment Methods Team has defined ten research areas that will promote improvements in the methodologies used for risk assessment. One of these research areas was funded by NIOSH in a Cooperative Agreement with researchers at the University of North Carolina. This Cooperative Agreement will support research to evaluate the degree of concordance between toxicologic and epidemiologic estimates of risk for carcinogenic hazards. NIOSH, EPA, and NCI have committed to a 1999 RFA for research focusing on the development of cancer risk assessment methods and practices. The team is also currently planning a workshop on future directions in risk assessment methods research that will be held in the summer of 2000.

Social and Economic Consequences of Workplace Illness and Injury Team

The Social and Economic Consequences of Workplace Illness and Injury Team is developing comprehensive bibliographies of published research on the social and economic consequences of workplace illness and injury. Additionally, the team, in conjunction with the Health Services Research Team, has been organizing a national conference entitled, "Functional, Economic, and Social Outcomes of Occupational Injuries and Illnesses: Integrating Social, Economic, and Health Services Research," to be held June 13 - 15, 1999, in Denver, CO. This conference will address performance measures for health services delivered to prevent or treat occupational injury or illness, measures of the economic and social impact of occupational injury or illness, and research that integrates these areas. Researchers from government agencies, public and private research organizations, academic institutions, and worker groups will provide their individual professional opinion, judgment, and recommendations for a position paper. To generate focused discussion, summary reports on the current state of knowledge will be provided.

Special Populations at Risk Team

The Special Populations at Risk Team assisted in the development of the July 1999 volume of the quarterly journal, *Occupational Medicine: State of the Art Reviews*, which will focus entirely on the issues facing special populations at risk. Several team members also participated in the development of the Institute of Medicine report, *Youth at Work*, which was released in November 1998. This study, which was cosponsored by NIOSH, the Robert Wood Johnson Foundation and other federal agencies, included recommendations for data collection and research to guide prevention efforts, as well as a number of recommendations for regulation, and better preparing youth for the world of work. With NIOSH funding, several of the team members helped to organize a new research track at the annual migrant stream forum meeting. As a direct result of this effort a new research listserv has recently been initiated. The team is also addressing research directions for the aging workforce.

Surveillance Research Methods Team

The Surveillance Research Methods Team is engaged in a variety of activities to develop and implement a national agenda for surveillance. The NORA FY 99 RFA includes solicitation for grant proposals on surveillance research methods. The team has been working with the Exposure Assessment and Surveillance Research Methods Teams on exposure surveillance issues.

The Team is also conducting additional outreach to four target groups: NIOSH state partners, labor, management, and academia. These efforts will provide the team and NIOSH with insight into external surveillance issues and expand the base of information from which to frame the team's vision and recommendations in a white paper for a national surveillance agenda.

Traumatic Occupational Injury Research Team

The initial activity of the Traumatic Occupational Injury Research Team was assisting with the sponsorship of the first National Occupational Injury Research Symposium (NOIRS) in October 1997. This was the first ever national conference on occupational injury research and was attended by over 300 occupational safety professionals from a wide variety of disciplines and organizations. The team is currently involved in the planning of the second Symposium, scheduled for October 2000.

The second major activity of the team was the development of a document describing the needs and priorities for traumatic occupational injury research in the U.S. Published by NIOSH in 1998, the document, "Traumatic Occupational Injury Research Needs and Priorities," provides a broad framework of the objectives and research needed to begin filling the gaps in knowledge and furthering progress toward safer workplaces and practices. This document provides a reference and structure for traumatic occupational injury research which can be used to facilitate the initiation of new, and the rekindling of existing, partnerships and collaborative research to prevent worker injuries and deaths. The team is encouraging agencies and organizations to use this document as a basis for planning and prioritizing their own research and for pursuing new partnerships and identifying topics for collaborative efforts.

Kudos for NORA

NORA has received broad support from many quarters. Below is a sample of recent comments.

Senate Committee on Appropriations Report Accompanying the FY 1999 NIOSH Appropriation:

"The Committee is encouraged with the progress by NIOSH on implementing the National Occupational Research Agenda [NORA]. The Committee is supportive of NIOSH's efforts to further its partnerships with the occupational safety and health community and the broader public and private public health research community, and believes these partnerships will be important in the implementation phase. The Committee urges NIOSH to work with its partners to augment resources available to the Institute for NORA research. In particular, the Committee strongly encourages NIOSH to continue partnering with the National Institutes of Health to cosponsor and fund extramural research in relevant NORA priority areas."

Institute of Medicine, *Reducing the Burden of Injury*, (October 1999)

"The [Committee on Injury Prevention and Control] applauds NIOSH in its paradigmatic approach to research priority setting through NORA. The contemporary scientific community values planning as a tool for setting broad priorities and integrating diverse research programs."

Institute of Medicine, *Reducing the Burden of Injury*, (October 1999)

"The recent undertaking by NIOSH provides a useful model of how to engage public and private partners to set research priorities based on explicit criteria. Through the National Occupational Research Agenda, NIOSH was able to examine broadly perceived needs and systematically address those topics that were most likely to yield gains to protect workers."

National Asphalt Pavement Association (September 1998)

"[The asphalt partnership] has evolved into a visible model for the NORA concept of partnerships in national occupational health and safety research. We are presently working with NIOSH through NORA to expand our industry partnership and we are confident that NIOSH will be replicating these successful partnership activities in other industries."

National Association of State Universities and Land-Grant Colleges (March 1999)

". . . we strongly support the National Occupational Research Agenda and believe that an investment . . . is needed to continue successful implementation of this national research plan."

National Center for Environmental Health (November 1998)

"[We] have been impressed by the quality of the National Occupational Research Agenda developed by NIOSH and think it is time to have a coherent national policy around environmental health as well."

Occupational Hazards Magazine "Rebirth of NIOSH" (December 1998)

"NORA also is promoting partnerships between research groups which once competed for the same dollars and organizations which have long histories of being at odds with each other."

The American Lung Association and the American Thoracic Society (April 1999)

"[We] would like to bring to your attention the National Occupational Research Agenda. . . . In 1996, NIOSH convened a panel of experts from the scientific, labor and corporate communities to layout a plan for occupational health research . . . We strongly recommend . . . support for the National Occupational Research Agenda at NIOSH."

NORA Milestones

July 1995 - May 1999

- July 1995 NIOSH commits to lead the creation of an Agenda
- September 1995 Agenda framework developed and 50 potential topics identified by initial working group of internal and external scientists
- November 1995 First National public meeting to provide input into Agenda and discuss criteria for priorities
- January 1996 Four additional working groups (NIOSH, external researchers, health professionals, other stakeholders) expand and prioritize priority areas
- February 1996 Three town meetings (Boston, Chicago, and Seattle) convened
- March 1996 Second National public meeting to review Agenda and draft report
- April 1996 Final Agenda—National Occupational Research Agenda—identifies 21 priority research areas to guide occupational safety and health research (released on NIOSH 25th Anniversary)
- November 1996 Partnership teams formed to implement the NORA priorities
- January 1997 First Best Practices Conference for Musculoskeletal Disorders, Chicago, IL
- February 1997 First ever survey of federal (non-NIOSH) resources committed to occupational safety and health research
- July 1997 First NORA Implementation Symposium held at the National Academy of Sciences, Washington, D.C.
- July 1997 NORA Update 1997 document released
- October 1997 The Traumatic Injury NORA Team convened the first ever National Occupational Injury Research Symposium, Morgantown, WV
- November 1997 Congress appropriates \$5 million for the implementation of NORA
- Jan-Feb 1998 Three NIH Institutes each contribute \$1 million to NORA research priorities
- March 1998 RFA for largest ever funding for targeted occupational safety and health research (\$8 million) announced by NIOSH and NIH partners
- March 1998 American Association of Occupational Health Nurses and the American College of Occupational and Environmental Medicine partner to establish a joint research award, with emphasis given to NORA in the selection criteria
- April 1998 NORA logo created

- May 1998 NORA and the asphalt partnership both selected as semifinalists (two of 100 semifinalists — two of 19 federal semifinalists) for the Ford Foundation and Harvard University's 1998 Innovations in American Government Awards Program from an initial pool of 1,420 applicants.
- May 1998 First issue of the NORA newsletter *NORA News* distributed
- May 1998 NORA Web site mounted
- July 1998 NORA 1998 Update document released
- September 1998 Asphalt research partnership selected as one of 25 finalists in the 1998 Innovations in American Government awards program
- September 1998 First private sector funds (Aetna U.S. Health Care) leveraged for NORA research (musculoskeletal disorders project)
- October 1998 First NORA research grants announced— 49 grants totaling \$8 million make up the single largest infusion of funding ever by the federal government for extramural investigator-initiated occupational health and safety research
- October 1998 NIOSH received permission to trademark the NORA logo
- October 1998 Congress continues to provide support for NORA through a \$12 million appropriation in the FY 99 NIOSH budget
- February 1999 The President's FY 2000 budget proposal to Congress includes \$12 million for NORA to support both intramural and extramural research and related activities.
- March 1999 Second survey of federal (non-NIOSH) resources committed to occupational safety and health research (FY 98)
- March 1999 Liaison Committee conducts two surveys to determine the effectiveness and reach of NORA among associations and private industry
- March 1999 NIOSH/NIH request NORA grant applications for FY 99 — \$7.5 million in awards anticipated
- April 1999 NIOSH/EPA/NCI announced RFA for \$1.5 million for research focusing on the development of cancer risk assessment methods and practices
- May 1999 NORA Update 1999 document released
- May 1999 First "NORA Partnering Award For Worker Health and Safety" awarded to the Asphalt Research Partnership
- May 1999 NORA Symposium 1999: Partnership for Research held at the National Academy of Sciences, Washington, D.C.

Summary

The implementation of NORA has been a huge success in its first three years. Those dedicated to NORA and occupational safety and health have produced:

- An enthusiastic and productive, broad-based NORA Liaison Committee
- Successful efforts of 20 NORA teams, including outreach, conferences and symposia, and production of white papers and documents, and journal articles.
- The participation of a large number of federal agencies in NORA activities.
- A successful grants process which has produced record-breaking funding for targeted occupational safety and health research in both FY 98 and FY 99.
- Two surveys (FY 96 and FY 98) of federal occupational safety and health research investment.
- Evidence that a national Research Agenda was, and continues to be, needed and that NORA research priority areas were well chosen.
- Recognition that NORA continues to be used as a model for public-private partnerships and is being widely used by other organizations in similar planning efforts.
- For the first time, a broad-based network of public and private partnerships in occupational safety and health.

Notes

(continued from front cover)

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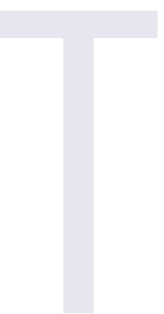
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