

Overview of the Respiratory Diseases Research Program (RDRP)

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WORKPLACE SAFETY AND HEALTH



Outline of Presentation

- “Relevance” of Work-Related Respiratory Diseases
- Overview of RDRP
- Examples of Impact by RDRP and Others

“Relevance” of Work-Related Respiratory Diseases

| Disease | Attributable Fraction | Number of Cases | Number of Deaths |
|----------------|----------------------------------|------------------------|-------------------------|
| Asthma | 15% | 2.4 million* | 571-1091 |
| COPD | 14% | 1.6 million** | 5092-24,440 |
| Pneumoconioses | 100% | - | 1087 |
| Tuberculosis | 5% | 705*** | 55-68 |
| | | | |
| Lung Cancer | Men: 8.0 -19.2% Women: 2% | — | 9677 - 19,901 |
| Mesothelioma | Men: 85 – 90% Women: 23 – 90% | — | 1895 – 2366 |

Adapted from: Steenland et al. *Am J Indus Med* 43:461, 2003. Data for 1997, except as noted: *prevalent, 2002; **prevalent, 2004; ***incident, 2005



“Relevance” of Work-Related Respiratory Diseases

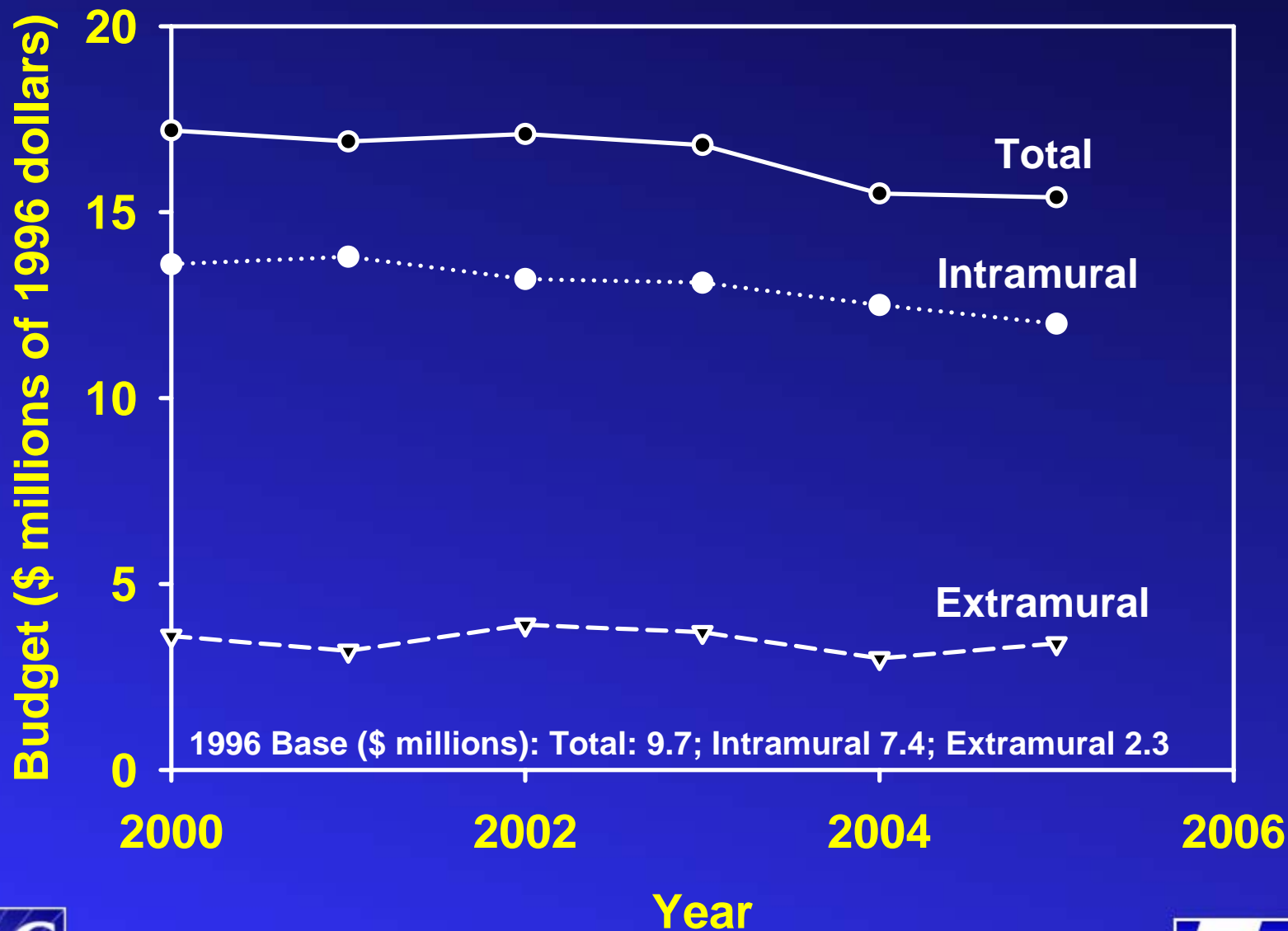
- Previously unanticipated agents continue to emerge:
 - ◆ artificial butter flavorings
 - ◆ nylon flock
 - ◆ waterproofing spray
 - ◆ weaponized anthrax, SARS-coronavirus, avian influenza
- Emergence of some agents must be anticipated:
 - ◆ nanoparticulates
 - ◆ pandemic influenza

What is RDRP?

Definition: The broad range of individuals and groups supported by NIOSH to do work that is relevant to occupational respiratory disease

Includes almost all intramural elements of NIOSH, as well as extramural research that is funded by NIOSH

RDRP Budget, 2000 - 2006 (adjusted for BRDPI)



NIOSH / RDRP Planning

- **1983:** NIOSH and partners identified, “10 leading work-related diseases and injuries.” Occupational lung disease was the top-ranked problem; asbestosis, byssinosis, silicosis, CWP, lung cancer, occupational asthma highlighted
- **1986:** RDRP produced a multidisciplinary “Proposed National Strategy for the Prevention of Occupational Lung Diseases”
- **1996:** The National Occupational Research Agenda (NORA)
- **2005 – present:** NIOSH matrix management structure
- **2006 - present:** NORA’s second decade

RDRP Matrix Management (2006)

- RDRP Cross-Institute Steering Committee
- **Mission Statement:** To provide national and international leadership for the prevention of work-related respiratory diseases, using a scientific approach to gather and synthesize information, create knowledge, provide recommendations, and deliver products and services to those who can effect prevention
- Logic model developed to guide ongoing planning. Includes consideration of: inputs, activities, outputs, transfer, intermediate outcomes, end outcomes, and external factors

RDRP Strategic Goals

- Prevent and reduce work-related airways diseases
- Prevent and reduce work-related interstitial lung diseases
- Prevent and reduce work-related respiratory infectious diseases
- Prevent and reduce work-related respiratory malignancies
- Prevent respiratory and other diseases potentially resulting from occupational exposures to nanomaterials

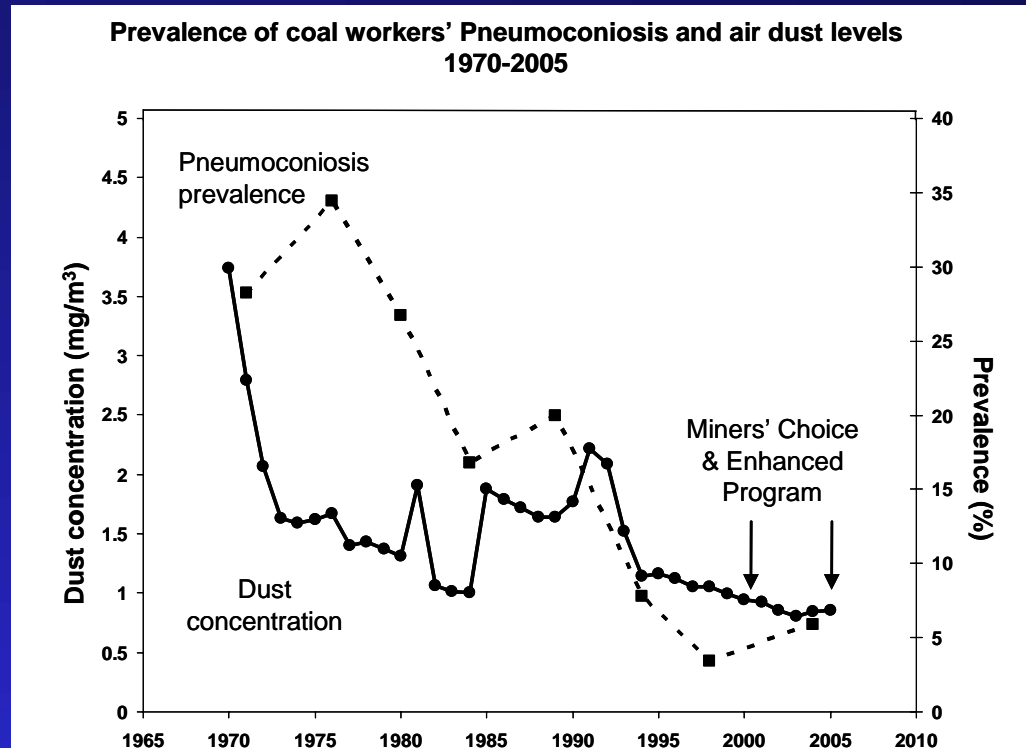
Many types of activities are embodied within the strategic goals: multidisciplinary research; surveillance; development of authoritative recommendations; health communications; and training and education



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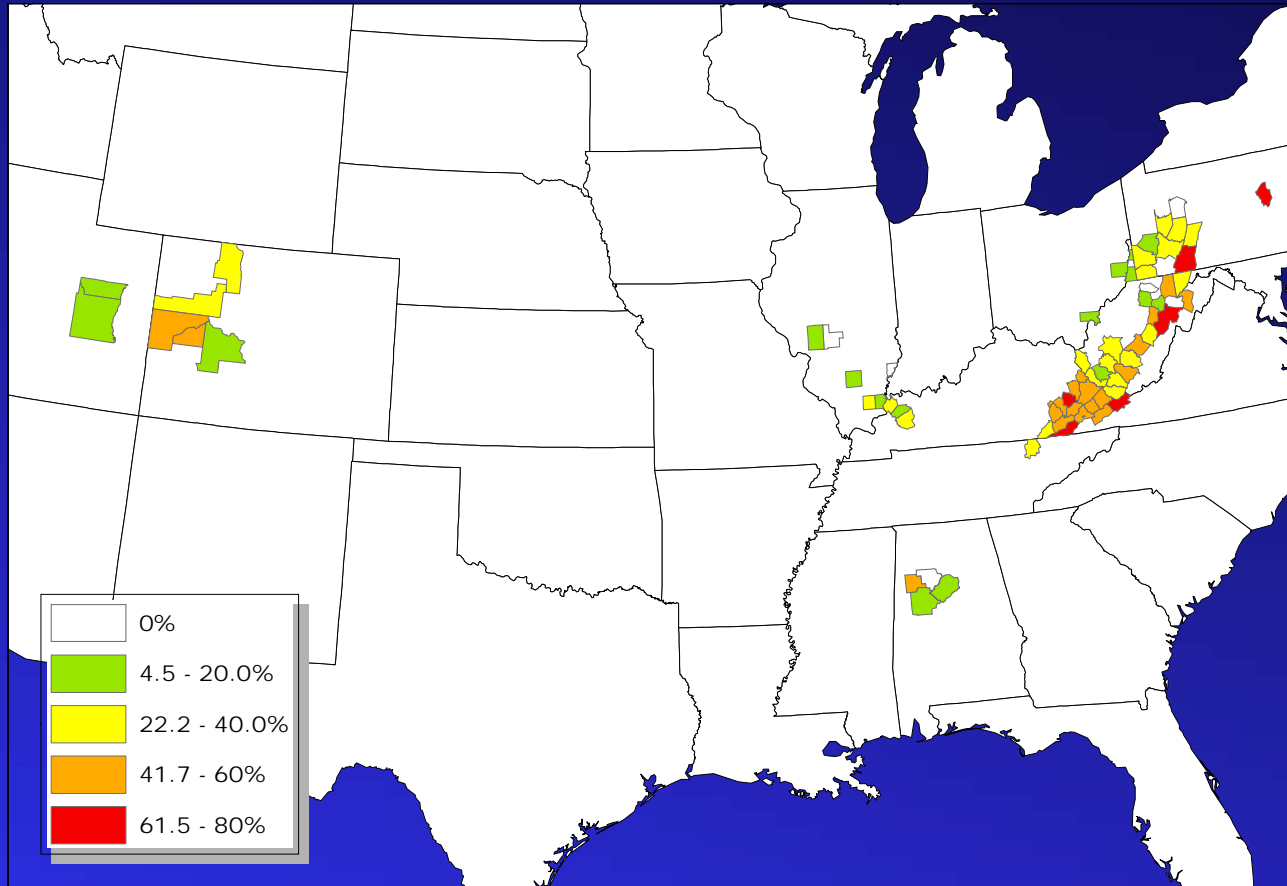
Coal Workers' Pneumoconiosis (CWP)



- A key focus since the beginning of NIOSH
- Extensive program of preventive interventions and surveillance
- Reduced exposures and disease prevalence

Coal Workers' Pneumoconiosis (CWP)

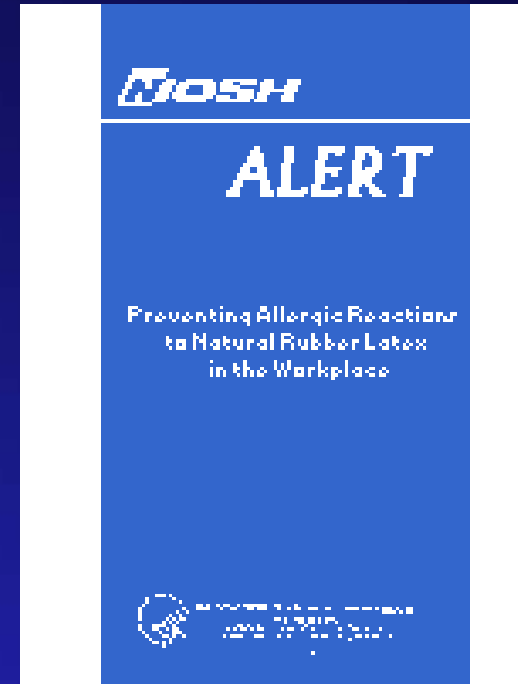
Proportion of Evaluated Miners with Rapidly Progressive CWP by County



Antao et al. 2005

- Surveillance reveals that clusters of advanced disease are still a problem (MMWR 2006)

Latex Allergy



- Epidemic of natural rubber latex (NRL) allergy associated with increased powdered NRL glove use in the early 1990s
- NIOSH Alert (1997): provided guidance on known approaches to prevent NRL allergy and asthma

Latex Allergy

Demonstration Project: HCW sensitization to NRL before and after adoption of NIOSH recommendations

| | HCWs |
|-----------------------------------|-------------------|
| <u>1 yr before change*</u> | |
| SPT – to + | 7709 (1%) |
| SPT + to - | 0/29 (0%) |
| <u>3 yrs after change</u> | |
| SPT – to + | 0/659 (0%) |
| SPT + to - | 4/30 (13%) |

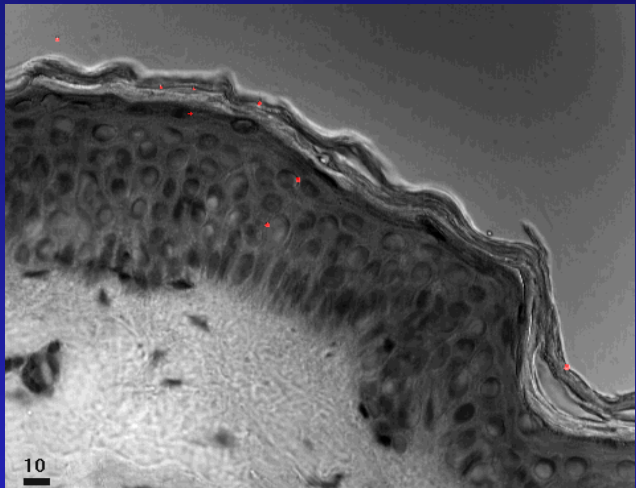
Prospective study at 2 hospitals.

Kelly et al. Presented, AAAAI 2003

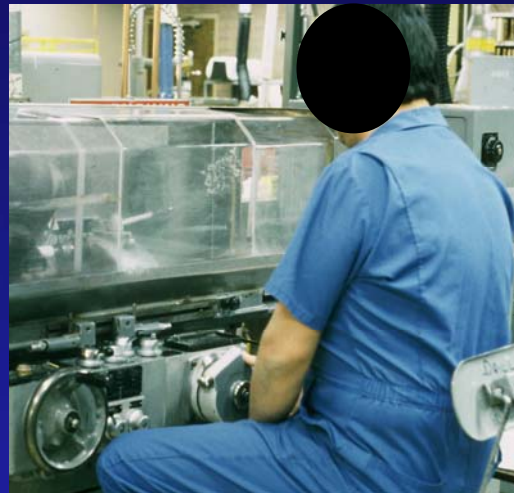
“The latex epidemic hit its peak in the mid-1990s. Since then, the apparent prevalence of latex allergy has been steadily decreasing”

Ranta PM, Ownby DR. Clin Infec Dis 2004;38:252-256

Chronic Beryllium Disease



Penetration of One Micron Beads into Epidermis. *Tinkle et al. 2003*



1980s



2004

Changes in Beryllium Processing Work Practices: Dermal Protection

- Epidemiological studies: Protection against inhalation exposures alone was insufficient to prevent beryllium sensitization
- Laboratory studies: Showed potential for sensitization by skin exposure to ultrafine particles of beryllium
- New work practices: Reduction in sensitization rates from 5.6 to 0.7 cases of sensitization per 1000 person-months of employment

Flavorings-Induced Lung Disease

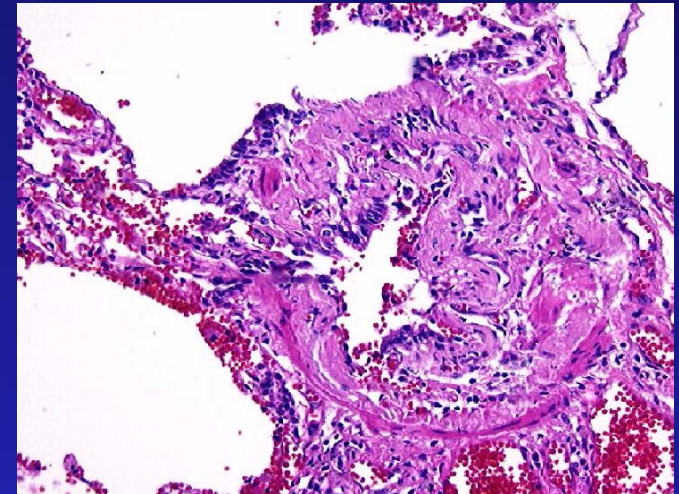


CLINICAL BRONCHIOLITIS OBLITERANS IN WORKERS AT A MICROWAVE-POPCORN PLANT

KATHLEEN KREISS, M.D., AHMED GOMAA, M.D., Sc.D., GREG KULLMAN, PH.D., KATHLEEN FEDAN, B.S.,
EDUARDO J. SIMOES, M.D., M.Sc., M.P.H., AND PAUL L. ENRIGHT, M.D.

330 • N Engl J Med, Vol. 347, No. 5 • August 1, 2002 • www.nejm.org

Bronchiole in Affected Worker



Marked submucosal fibrosis
causing severe narrowing of
airway lumen (*Akpinar-Elci. Eur Resp
J 2004; 24:298-302*)

Flavorings-Induced Lung Disease

Impact on an individual workplace:



Before NIOSH Evaluation



After NIOSH Evaluation

Impact beyond the individual workplace:

- Recognition of cases in other settings
- Petitions to Federal OSHA and California OSHA for emergency temporary standards for diacetyl

World Trade Center – Related Respiratory Health Problems



The World Trade Center Disaster and the Health of Workers: Five-Year Assessment of a Unique Medical Screening Program

Robin Herbert, Jacqueline Moline, Gwen Skloot, Kristina Metzger, Sherry Baron, Benjamin Luft, Stephen Markowitz, Iris Udasin, Denise Harrison, Diane Stein, Andrew Todd, Paul Enright, Jeanne Mager Stellman, Philip J. Landrigan, and Stephen Levin



- Early after the disaster, RDRP played an important role in helping NYC and others implement procedures for occupational safety and health
- In the aftermath of the disaster, RDRP continues to play an important role in the long-term follow up monitoring and treatment of survivors

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RDRP Scientific Presentations

Long-Standing Concerns

- Respiratory Diseases Induced by Coal Mine Dust: Attfield
- Silica-Induced Diseases: Castranova
- Work-Related Asthma: Henneberger

Emerging Issues

- Flavoring-Induced Lung Disease: Kreiss
- Nanotechnology: Schulte

Surveillance

- Respiratory Diseases Surveillance: Mazurek

