

# National Personal Protective Technology Laboratory

## NIOSH PPT Program Evaluation and Surveillance



*Evidence for the  
National Academies'  
Review of the*

**NIOSH**

**Personal Protective Technology Program**



The Personal  
Protective  
Technology  
Program  
at NIOSH



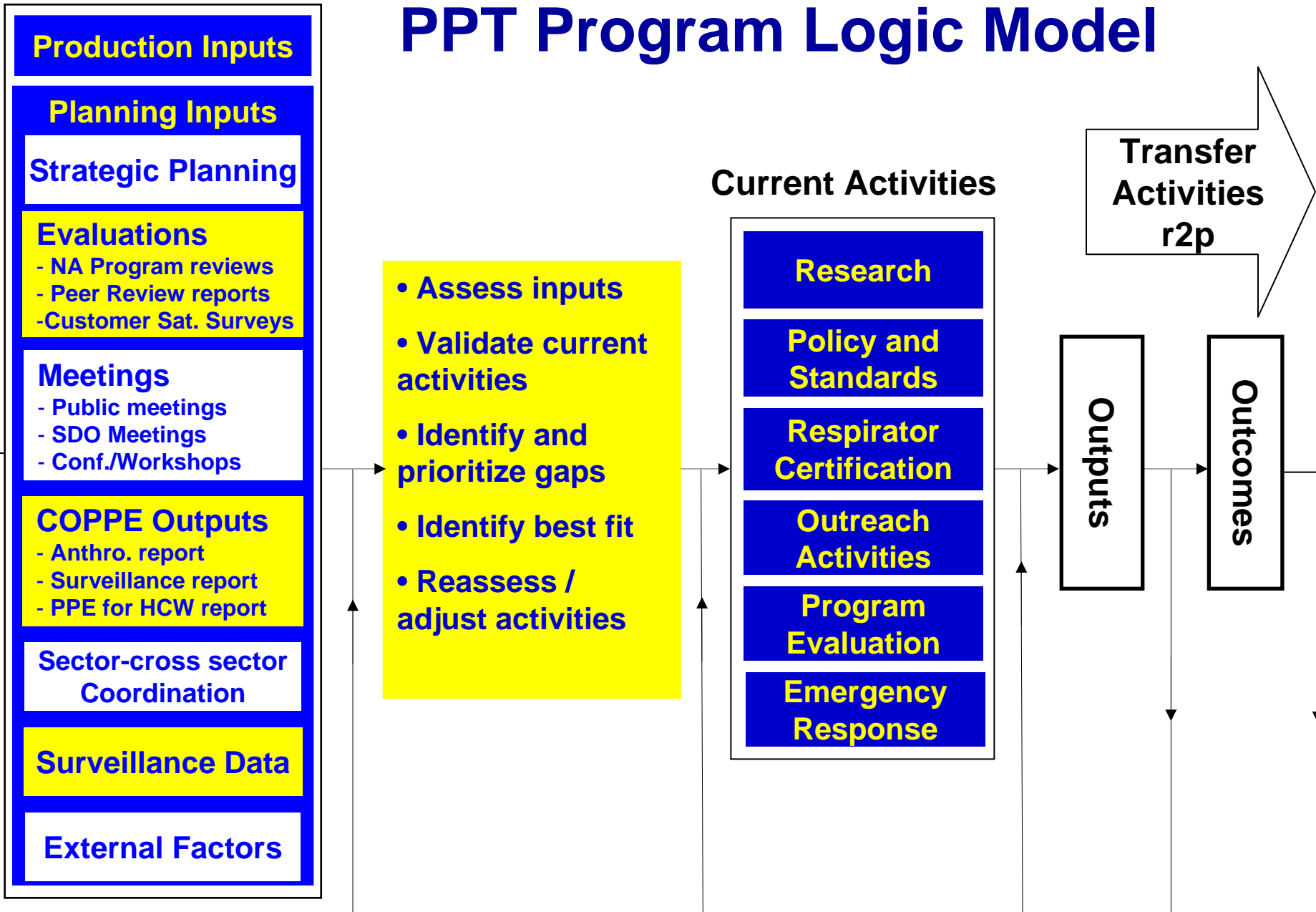
**Maryann D'Alessandro, Ph.D.**  
NPPTL Associate Director for Science  
PPT Program Coordinator

**PPT Stakeholder Meeting  
March 3, 2009**



# Program Inputs

# PPT Program Logic Model



# Overview

## Scientific Inputs to the PPT Program

Enhance the quality and credibility of PPT Program contributions to NIOSH science by maximizing the quality inputs to the PPT Program

- National Academies COPPE
- Conducting Scientific Evaluations of Activities
  - National Academies Program Evaluation
  - National Academies Scientific Reviews
  - Scientific Information Product Peer Review
  - Scientific Proposal and Protocol Peer Reviews
  - Action Planning Assessments
- PPT Surveillance



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*Advisers to the Nation on Science, Engineering, and Medicine*

# PPT Planning Input - COPPE Background

## Established in 2005

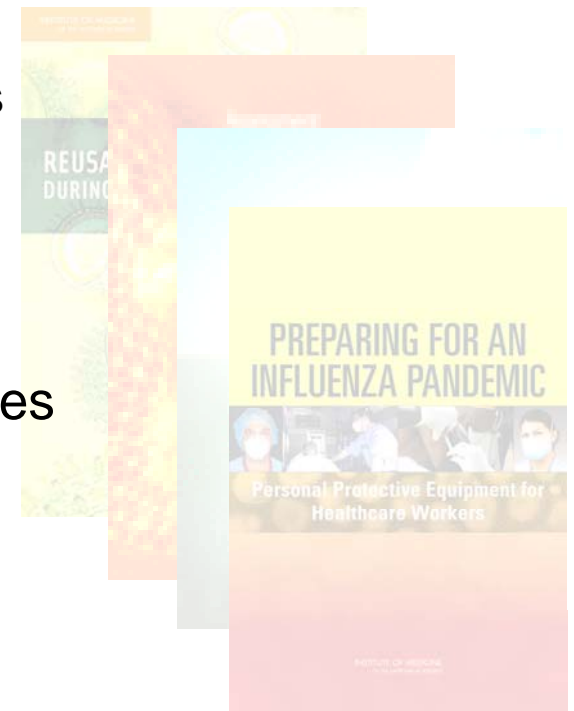
- First meeting Nov 2005
- 2-3 open meetings conducted annually
  - NPPTL Listserv announcement posted to announce meetings
  - NPPTL Listserv announces availability of reports

## COPPE Charge

- Forum for discussing scientific and technical PPE/PPT issues relevant to PPT Program mission
- Liaison and oversight to ad hoc study committees requested by NIOSH and approved by the IOM and the NA

## COPPE Outputs

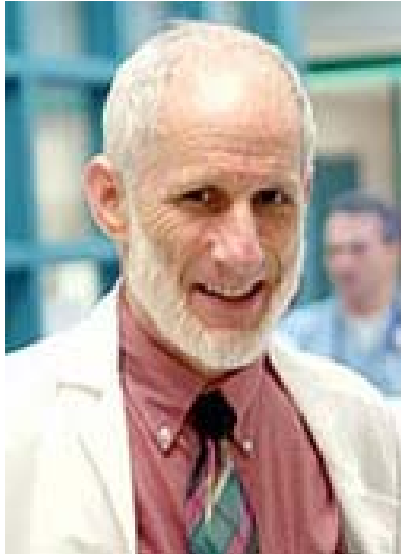
- 2 Evaluations conducted
- 1 Workshop study
- 1 HHS Study supported
- 1 PPT Program study conducted



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# Committee on Personal Protective Equipment for Workplace Safety and Health (COPPE)

*Lewis R. Goldfrank, M.D. (Chair)*



Lewis R. Goldfrank, M.D. has worked at Bellevue Hospital Center and New York University (NYU) Medical Center for the last quarter century. He is currently the first chairman and professor of the newly established academic Department of Emergency Medicine at NYU, where his efforts have led to the development of the university's emergency medicine and medical toxicology residencies. Dr. Goldfrank is also the medical director of the New York City Health Department's Poison Center. His career has been spent working in the public hospitals of New York City, emphasizing the role of emergency medicine in improving access to care, public health, public policy, and medical humanism. He has assisted in numerous projects in South America, Asia, and Europe in the advancement of emergency medicine and medical toxicology, emphasizing his interests in the improvement of global health. Dr. Goldfrank recently has served on three committees (as chair for two of them) dealing with issues of terrorism: civilian medical response to chemical and biological terrorism; metropolitan medical response teams and preparedness for terrorism; and the psychological consequences of terrorism. Educated at Clark University, Johns Hopkins School of Medicine, and the University of Brussels, Belgium, he graduated from the University of Brussels Medical School in 1970. He completed his residency in Internal Medicine at Montefiore Hospital and Medical Center in 1973. He is a member of the Institute of Medicine.

**Institute of Medicine  
Standing Committee on  
Personal Protective Equipment  
for Workplace Safety and  
Health**

**Lewis Goldfrank, M.D., Chair**



# Institute of Medicine

- Established in 1970, under 1863 Congressional charter of the National Academy of Sciences
- Honorary membership organization
- Provides independent advice to the government and other sponsors
- Work through:
  - Ad hoc study committees
  - Standing committees
  - Forums and roundtables
- Value Added:
  - Balanced, expert committees
  - Objective and independent
  - Rigorous peer review process
  - Open to public observation and input
  - Evidence-based consensus recommendations
  - Unbiased advice



# Committee on Personal Protective Equipment for Workplace Safety and Health Task

- Serve as a forum for discussion of scientific and technical issues relevant to the development, certification, deployment, and use of personal protective equipment, standards, and related systems to ensure workplace safety and



## Committee Members

- Lewis R. Goldfrank, M.D. (*chair*), New York University School of Medicine
- Charles Austin, M.S, Sheet Metal Occupational Health Institute Trust
- Linda Hawes Clever, M.D., California Pacific Medical Center
- Howard J. Cohen, Ph.D., Consultant
- Robert Cohen, M.D., Stroger Hospital of Cook County
- Robyn R. Gershon, Dr.P.H., Columbia University
- Sundaresan Jayaraman, Ph.D., Georgia Institute of Technology
- Melissa McDiarmid, M.D., M.P.H., University of Maryland School of Medicine
- Jimmy Perkins, Ph.D., University of Texas Health Science Center
- James Platner, Ph.D., Center to Protect Workers' Rights
- David Prezant, M.D., New York City Fire Department
- Knut Ringen. Dr.P.H., Consultant
- Bonnie Rogers, Dr.P.H., M.P.H., University of North Carolina, Chapel Hill
- Jeffrey O. Stull, M.Sc., International Personnel Protection, Inc.
- James Tacci, M.D., Xerox Corporation
- Gary C. Tepper, Ph.D., Virginia Commonwealth University



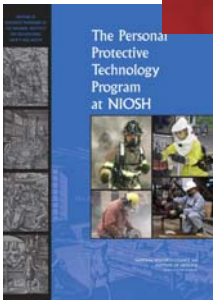
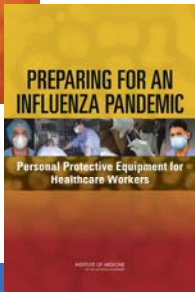
# Meeting Topics

- PPT standards development
- Tour of NPPTL Lab
- Surveillance on use of PPT
- Healthcare workers, pandemic influenza, and PPE
- Systems approach to PPT development and evaluation
- Cost-effectiveness research
- Organizational management approaches



## Related IOM/NRC Reports

- *Measuring Respirator Use in the Workplace*
- *Assessment of the NIOSH Head-and-Face Anthropometric Survey of U.S. Respirator Users*
- *Preparing for an Influenza Pandemic: Personal Protective Equipment for Healthcare Workers*
- *The Personal Protective Technology Program at NIOSH*



- **Committee on Personal Protective Equipment**
  - **for Workplace Safety and Health**
    - **For more information:**
    - <http://www.iom.edu/workplacesafety>
      - Reports available through
      - National Academies Press
        - [www.nap.edu](http://www.nap.edu)



# PPT Program Evaluation



REVIEWS OF  
TECH PROGRAMS OF  
NATIONAL INSTITUTE  
OCCUPATIONAL  
SAFETY AND HEALTH

## The Personal Protective Technology Program at NIOSH

NATIONAL RESEARCH COUNCIL AND  
INSTITUTE OF MEDICINE  
OF THE NATIONAL ACADEMIES

# Who reviewed the PPT Program?

**E. John Gallagher (Chair), Albert Einstein College of Medicine, Bronx, NY**  
**Roger L. Barker, North Carolina State University, Raleigh, NC**  
**Howard J. Cohen, University of New Haven, CT**  
**Janice Comer-Bradley, International Safety Equipment Association, Arlington, VA**  
**Elizabeth A. Corley, Arizona State University, Phoenix, AZ**  
**Richard M. Duffy, International Association of Fire Fighters, Washington, DC**  
**James S. Johnson, JSJ and Associates, Pleasanton, CA**  
**James M. McCullough, SRI International, Arlington, VA**  
**Jimmy Perkins, University of Texas Health Science Center, San Antonio, TX**  
**David Prezant, Albert Einstein College of Medicine; FDNY, Brooklyn, NY**  
**Knut Ringen, Independent Consultant, Seattle, WA**  
**Emanuel P. Rivers, Henry Ford Hospital, Detroit, MI**  
**Joseph J. Schwerha, University of Pittsburgh, Pittsburgh, PA**  
**Anugrah Shaw, University of Maryland, Eastern Shore, MD**  
**Tonya Smith-Jackson, Virginia Polytechnic Institute and State University, Blacksburg, VA**

## **Framework Committee Liaison**

**Susan Cozzens, Georgia Institute of Technology, Atlanta, GA**

## **Board on Health Sciences Policy Liaison**

**Martha Hill, Johns Hopkins University, Baltimore, MD**

# What was reviewed?

## PPT GOALS & OBJECTIVES

	PPT DOMAINS		
	Research	Policy & Standards	Respiratory Certification
<b>1. INHALATION</b>			
1.1. Maintain national inventory of respirators			
<b>1.2. CBRN</b>			
1.3. Mine escape respirators			
1.4. Anthropometrics			
1.5. Viral transmission/pandemic preparedness			
1.6. Nanotechnology			
1.7. ESLI			
1.8. Respirator use in the workplace			
<b>2. DERMAL</b>			
2.1. Chemical barrier protective clothing			
2.2. Emergency responder protective clothing			
2.3. Ergonomics of protective ensembles			
<b>3. INJURY</b>			
3.1. Warning devices for fire services			

# How was the Program reviewed?

**12 OBJECTIVES**

**3 DOMAINS**

**12 x 3 = 36 cells/level**

**36 x 4 = 144 cells total**

**RELEVANCE (scale of 1 to 5)**

**IMPACT (scale of 1 to 5)**

**EMERGING ISSUES**

**RECOMMENDATIONS**

# Overall Assessment of Relevance and Impact

**Relevance Score= 4**

**PPT program is working in priority areas and is engaged in transferring its research into improved products and processes.**

**Impact Score= 4**

**The PPT program has made some meaningful contributions to both intermediate outcomes and, to a lesser extent, end outcomes.**

# National Academies' Recommendations

**Recommendation 1: Implement and Sustain a Comprehensive National PPT Program**

**Recommendation 2: Establish PPT Research Centers of Excellence and Increase Extramural PPT Research**

**Recommendation 3: Enhance the Respirator Certification Process**

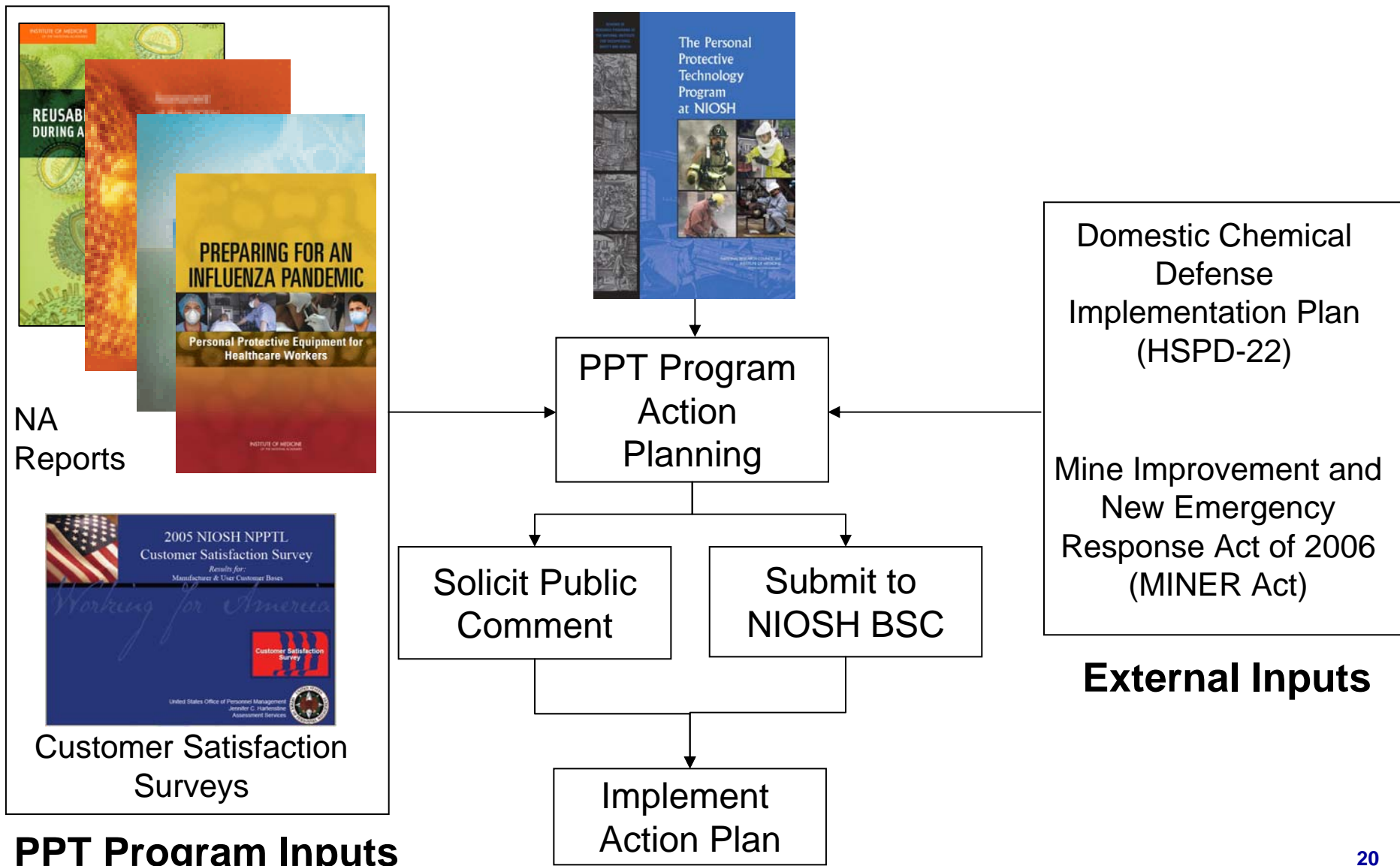
**Recommendation 4: Increase Research on the Use and Usability of PPT**

**Recommendation 5: Assess PPT Use and Effectiveness in the Workplace Using a Life-Cycle Approach**

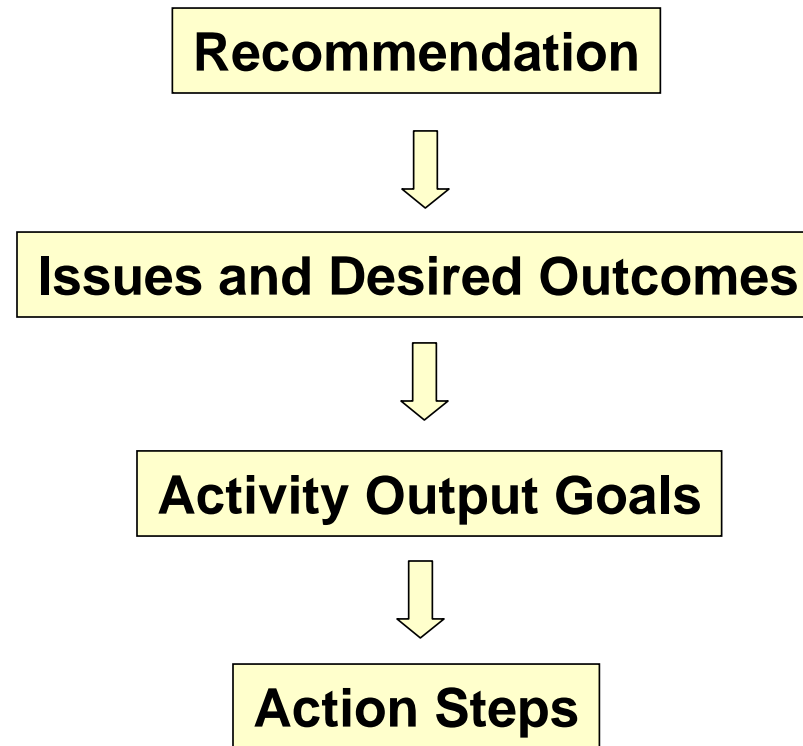
# Where do we go from here....



# PPT Program Approach to Address the Recommendations



# NIOSH PPT Program established a hierarchy to address the National Academies' recommendations



The hierarchy aligns with the NIOSH Program Portfolio planning and provides a comprehensive approach for moving the program forward.

# PPT Interpretation of the Recommendations

Each NA recommendation with its associated issues is addressed separately.

1. Comprehensive National PPT Program
2. Establish PPT Research Priorities and Expand the Extramural Program
3. Enhanced Respirator Certification Program
4. Research on use and usability of PPE
5. Assess PPT use and effectiveness using a lifecycle approach



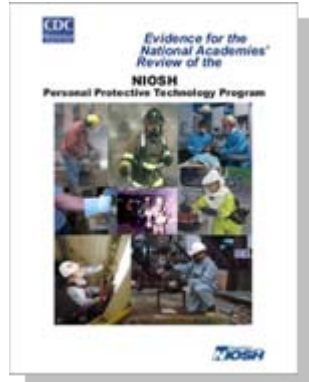
# Recommendation 1: Implement and sustain a comprehensive National Personal Protective Technology program

Issue 1.1: Organize research across all types of PPT and across all occupations and workplaces

Issue 1.2: Participate in policy development and standards setting across all types of PPT

Issue 1.3: Oversee certification of all PPT, including assessment of certification mechanisms

Issue 1.4: Promote the development, standards, and certification of integrated PPT components and ensembles



*Approximately \$12 M budget for PPT on FY09*

# Determine what emerging issues should be emphasized

## Current PPT Program Focus

- CBRN Issues
- Pandemic Influenza Preparedness
- Mine escape
- Nanotechnology

## Emerging Issues raised by Committee

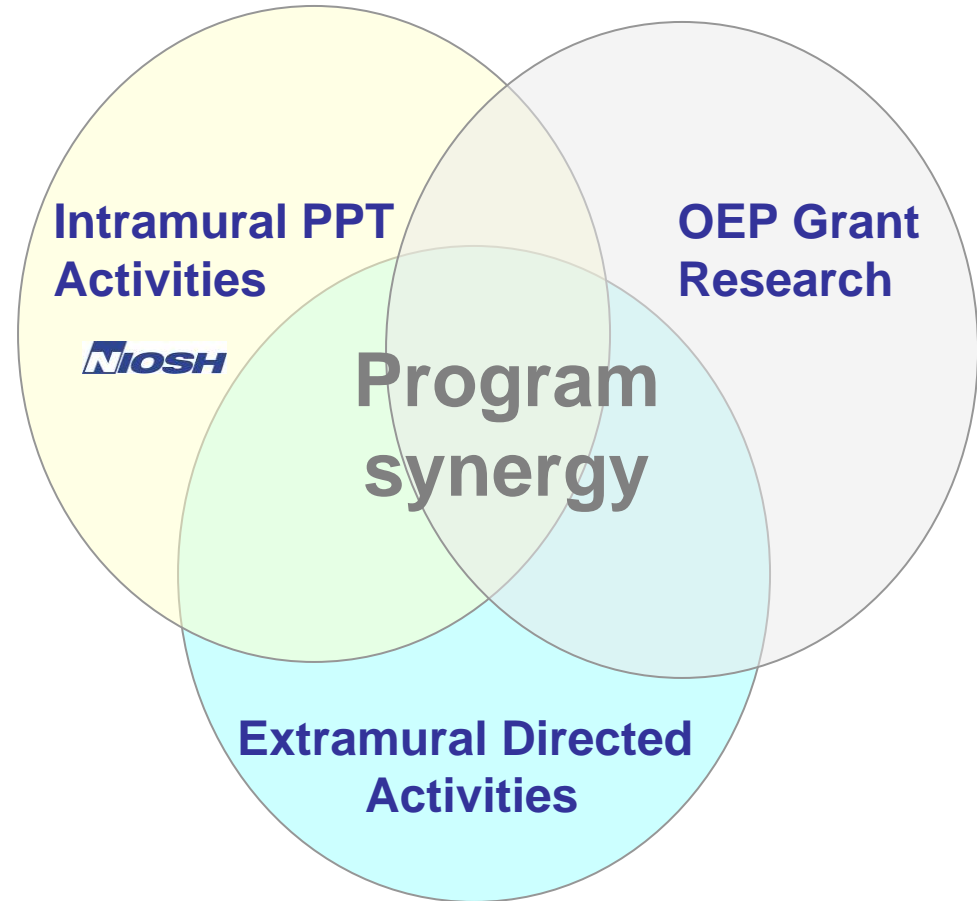
- New materials technology, including “no-fit” respirators
- PPT ensembles and seamless integration of multiple PPT components
- Usability, comfort, ergonomics, and human factors which determine whether or not the PPE is worn by the worker
- Enhancing the culture of workplace safety through worker education, training, and understanding of hazardous exposure risk to health

## Other emerging issues

# Recommendation 2: Establish PPT Research Priorities and Expand the Extramural Program

**Issue 2.1:**  
**Coordinate**  
**intramural and**  
**extramural**  
**research activities**

**Issue 2.2: Expand**  
**the extramural**  
**research program**



*Approximately 30 Extramural grants emphasize PPT*

# Recommendation 3: Enhance the Respirator Certification Program

**Issue 3.1: Explore ways to expedite revision of the respirator certification regulations**

**Issue 3.2: Assess the feasibility of updating certification fees**

**Issue 3.3: Examine the possibility of registering the purchase of NIOSH-certified respirators**

**Issue 3.4: Explore the expansion of the product audit program**

**Issue 3.5: Consider expanding the site audit program**

**Issue 3.6: Explore approaches for disseminating respirator certification test results data**

***Approximately \$6.4 M budget for PPT on FY09***



# Recommendation 4: Increase Research on the Use and Usability of PPT

**Issue 4.1: Define Barriers to and Facilitators of PPT Use**



**Issue 4.2: Develop innovative PPT designs and test methods to improve comfort, fit, and usability**



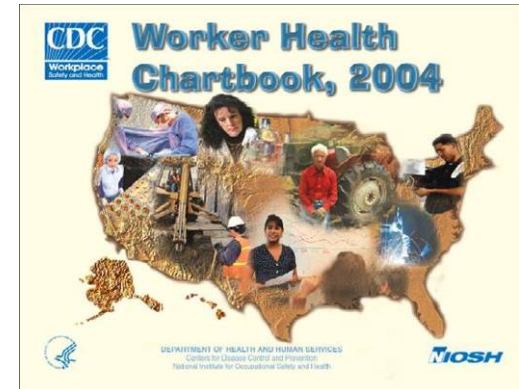
**Issue 4.3: Develop systems integration strategies for PPT and components**

*Approximately \$1.3 M budget for PPT on FY09*

# Recommendation 5: Assess PPT Use and Effectiveness in the Workplace Using a Life-Cycle Approach

**Issue 5.1: Establish a comprehensive surveillance program**

**Issue 5.2: Conduct random periodic field testing of PPE**



*Approximately \$1 M budget for PPT on FY09*

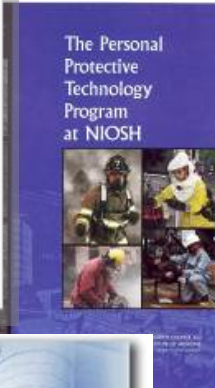
# Moving forward....



Image used with permission  
from Carmen Hurt, Mar 2, 2009

# Walking the walk...

## Develop the Plan



## Build the Foundation



## Implement the Plan



# State of PPT Program Surveillance

## PPE required in many settings

- PPT is a NIOSH identified cross sector impacting all sectors
- Workplace programs required
- Lack of educational programs

## Systematic collection of PPT data needed to inform PPT Program

Need to link exposure, PPE use, and outcome data in a meaningful way



# Organization/Staffing/Funding

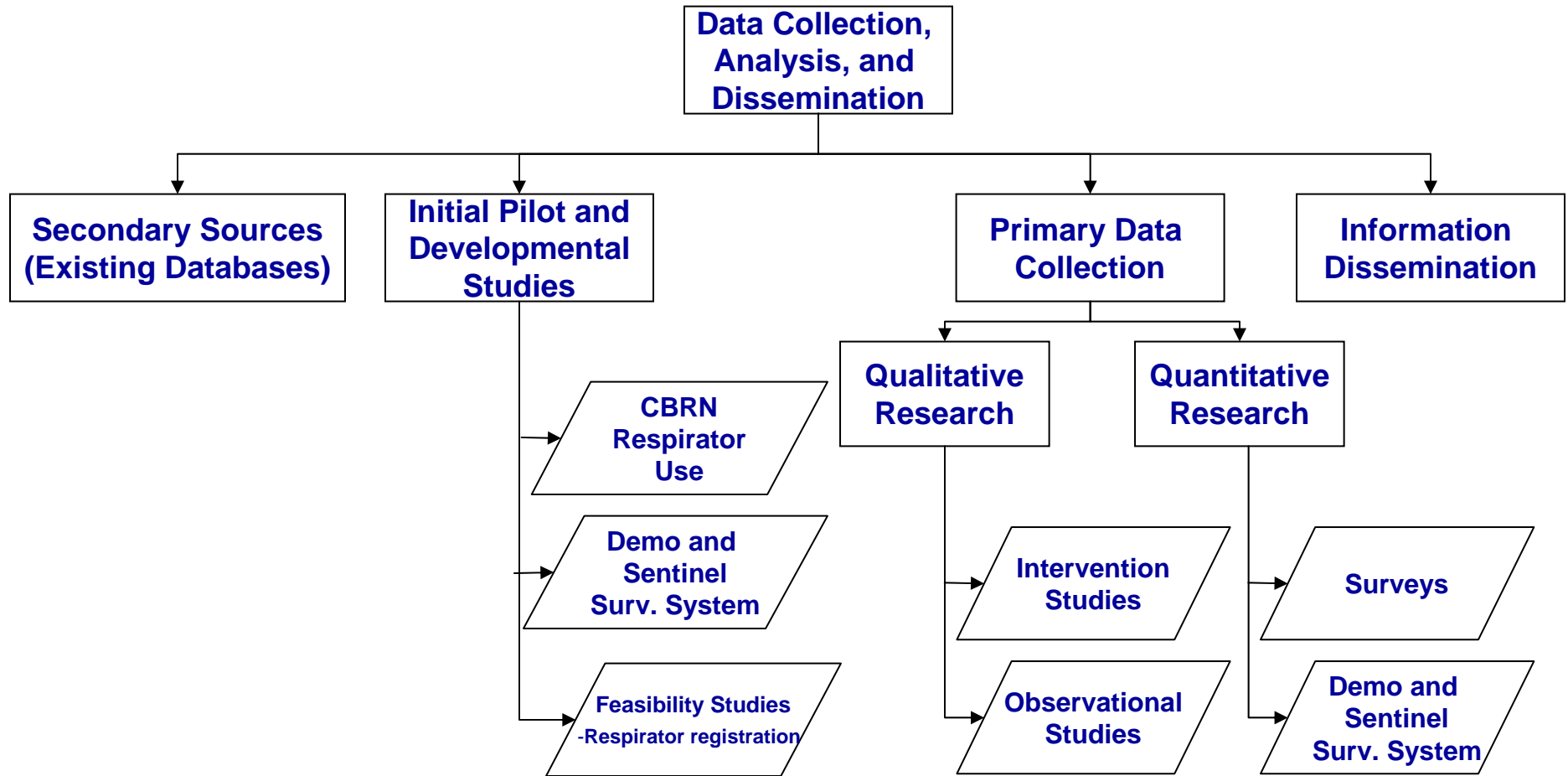
**Surveillance supported by multiple divisions & locations within NIOSH**

**NPPTL is the lead division for PPT Surveillance**

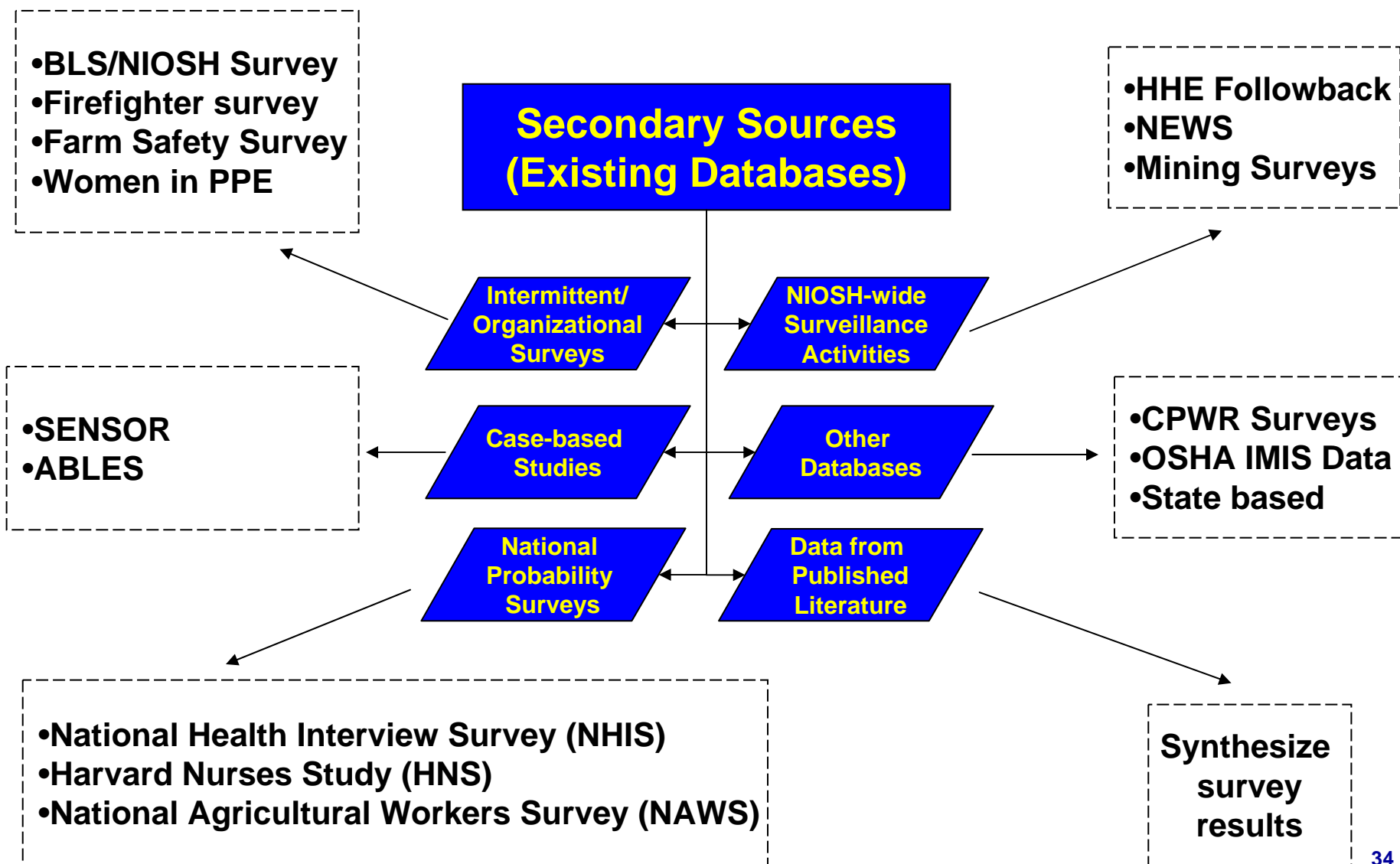
## **Current NIOSH PPT portfolio**

- Consists of 2 dedicated research projects and input to several NIOSH activities
  - Approximately \$300K funding for FY09
  - 1 FTE
- PPT emphasis is collaboration with intramural and extramural programs

# Data Collection and Analysis will Use Secondary Sources, Pilot Studies, and Primary Data Collection



# PPT Program Data Collection and Analysis will focus on assessing available secondary data sources



# Current PPT Program Surveillance Activities

- **PPT Program Surveillance Planning**
- **PPE Surveillance Intervention Studies**
- **PPT Secondary Data Assessment by Sector**
- **Demonstration and Sentinel Surveillance System (Poster)**
- **Evaluation of OSHA IMIS Data (Poster)**
- **PPT Questions added to surveys**
  - National Health Interview Survey (NHIS) Occupational Health Supplement
  - Mining Intervention Survey
  - CPWR Telephone Survey

# PPE Surveillance Intervention Studies

## Objectives:

- Evaluate and identify methods to improve respirator use in the construction industry
- Evaluate use of respirators with other PPE
- Identify shortcomings of current programs and develop potential interventions
- Implement and evaluate interventions

## Background:

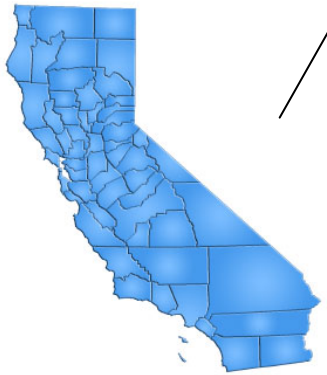
- BLS/NIOSH Survey conducted in 2001

## Status:

- Visited 4 NDA/2 large ARTBA sites
- Visited 3 small ARTBA companies, 7 pending
- Intervention strategies and effective construction programs may be leveraged to improve respirator use in other industries



# PPT Secondary Data Assessment by Sector Agriculture Sector

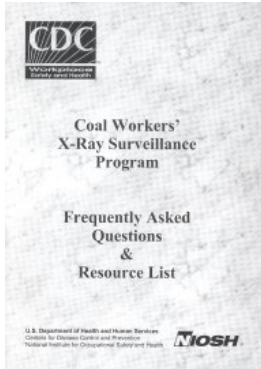


**Initial assessment  
of PPT Knowledge  
Gaps in  
Agriculture**

**Additional  
PPT Data  
Collection  
and  
Analysis**

**PPT  
Surveillance  
Strategy**

# The near term surveillance plan will maximize use of secondary data sources



Secondary sources serve as primary data collection



Continue qualitative surveillance in construction industry



Categorize PPT/PPE Knowledge gaps

# NIOSH NPPTL/PPT Program



Visit Us at: <http://www.cdc.gov/niosh/programs/ppt/>

<http://www.cdc.gov/niosh/npptl>

**Disclaimer:**

***The findings and conclusions in this presentation have not been formally disseminated by the National Institute for Occupational Safety and Health and should not be construed to represent any agency determination or policy.***

Thank you