National Institute for Occupational Safety and Health (NIOSH) Standing Committee on Personal Protective Equipment for Workplace Safety and Health (COPPE)

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Standing Committee on Medical Readiness
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Presentation Overview

• NPPTL and PPT Program Overview

• Questions to NPPTL
  – COPPE Value to NPPTL
  – IOM Staff interactions
  – Spin-off studies
  – Lessons learned
Agency Hierarchy

HHS
Department of Health and Human Services

CDC
Centers for Disease Control and Prevention

NIOSH
National Institute for Occupational Safety and Health

Div/Labs
NIOSH Divisions / Labs

NPPTL: ~$12 million 73 FTE

~$8.8 billion ~ 8,829 FTE

~$290.1 million ~ 1223 FTE
NIOSH Divisions & Laboratories

- Office of the Director, NIOSH
- Office of Extramural Programs
- Pittsburgh Research Laboratory (PRL)
- National Personal Protective Technology Laboratory (NPPTL)

- Division of Respiratory Disease Studies (DRDS)
- Division of Safety Research (DSR)
- Health Effects Laboratory Division (HELD)
- Education and Information Division (EID)
- Division of Applied Research and Technology (DART)
- Division of Surveillance Hazard Evaluation and Field Studies (DSHEFS)
- Office of Compensation Analysis and Support (OCAS)
- Research to Practice (r2p)
- Spokane Research Laboratory
## NIOSH Program Portfolio

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Cross Sector Programs (N=24):

- Radiation dose deconstruction
- Respiratory diseases
- Training grants
- Traumatic injury
- Work organization and stress-related disorders
- Economics
- Exposure assessment
- Engineering controls
- Work life initiative
- Occupational health disparities
- Small business assistance and outreach
- Surveillance
- Nanotechnology
- Prevention through design
NIO SH PPT/NPPTL
Vision & Mission

The VISION is to be the leading provider of quality, relevant, and timely PPT research, training, and evaluation.

The MISSION of the PPT program is to prevent work-related injury, illness and death by advancing the state of knowledge and application of personal protective technologies (PPT).

PPT in this context is defined as the technical methods, processes, techniques, tools, and materials that support the development and use of personal protective equipment worn by individuals to reduce the effects of their exposure to a hazard.
PPT Program Activities

Scientific Excellence

PPT Program Management

Outreach

Technology Evaluation

Policy & Standards Development

Technology Research

CDC Workplace Safety and Health

NIOSH

NPPTL Research to Practice through Partnerships
NIOSH PPT Program
NPPTL Priority Areas: Relevance and Impact

Mine Escape:
Technology Workshops
Respirator Research
- Docking / Hybrid
Escape Respirator Std.
Respirator Field Eval.
Refuge Chamber Eval.
Respirator Certification
MSHA Collaboration

CBRN (Terrorism):
- CBRN PPT Research
  - Threat Analysis
  - CWA Testing
  - Turnout Gear
- Respirator Standards
- Respirator Certification
- Ensemble Guidance
- OSHA and DHS Collaboration

Nanotechnology:
Research
- Respirator Filtration
- Protective Clothing
Workplace Guidance
Respirator Certification
OSHA Collaboration

Pandemic:
Research
- Cough Transmission
- Respirator Re-Use
- Fit Test Science
Standards
- Total Inward Leakage
Respirator Certification
OSHA / FDA Collaboration
Questions to NPPTL

• How has the COPPE standing committee been helpful to the work of NPPTL?
• How do you as the sponsor work with IOM staff to focus the meetings and the questions for the committee?
• What "spinoff" studies have occurred and how has the standing committee been helpful in focusing the tasks for those efforts?
• Lessons learned about working with standing committees to make them most effective in meeting our needs.
How has the COPPE standing committee been helpful to the work of NPPTL?
Quality science-based input needed for strategic planning

• Research directed to national priorities
• Only PPE with federal mandate to certify respirators
• Recognized need to update respirator certification regulations (42 CFR Part 84)
• Broad mission to address PPE needs across all industry sectors
• Fiscal responsibility
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 HHS Study supported
  – 1 PPT Program study conducted
  – 2 additional studies identified
COPPE Meeting Objectives

Obtain input from scientific and medical experts by:

• Leveraging expertise of scientific and medical community to provide input on user needs and PPE gaps
• Sharing project information
• Encouraging information exchange
• Obtaining program comment
• Generating ideas for future workshop studies
How do you as the sponsor work with IOM staff to focus the meetings and the questions for the committee?
Interaction with IOM staff

• Identify most appropriate committee representation
• Establish meeting focus
• Focus meetings and questions for the committee
• Identify appropriate meeting participants
• Follow-up on meeting actions
PPT Program Logic Model

**Inputs**

- **Production Inputs**
  - Strategic Planning
  - Evaluations
    - Peer reviews
    - NA Reviews
    - Customer Sat. Surveys

- **Planning Inputs**
  - Meetings
    - Public meetings
    - SDO Meetings
    - Conf./Workshops
  - NAS COPPE
    - Anthro. report
    - Surveillance report
    - PPE for HCW report
  - Sector-cross sector Coordination
  - Surveillance Data
  - External Factors

**Current Activities**

- Surveillance
- Research
- Policy and Standards
- Respirator Certification
- Outreach Activities
- Emergency Response

**Outputs**

- Assess inputs
- Validate current activities
- Identify and prioritize gaps
- Identify best fit
- Reassess / adjust activities

**Outcomes**

- Transfer Activities r2p

**Transfer**

- Meetings
  - Public meetings
  - SDO Meetings
  - Conf./Workshops
- Evaluations
  - Peer reviews
  - NA Reviews
  - Customer Sat. Surveys
- NAS COPPE
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- Sector-cross sector Coordination
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- External Factors

- Assess inputs
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- Transfer Activities r2p
What "spinoff" studies have occurred and how has the standing committee been helpful in focusing the tasks for those efforts?
PPT Program Planning Input

Evaluations - National Academies Involvement in PPT

• **Committee on PPE for the Workforce (COPPE)**
  - Three open meetings in FY06 and two in FY07 & FY08, 1 in FY09 to date
  - Workshop: Feb 22, 2007 – PPE during an Influenza Pandemic: Research, Standards, Certification and Testing Directions
  - Prepub report received Sep 2007, Briefing Sep 7, 2007, Final Jan 2008
  - Two potential studies identified for 2009-2010

• **Review of Anthropometrics Survey and Respirator Panel Modifications**
  - Three open meetings in FY06
  - Jan – Mar 2006 - Support to HHS for Committee on the Development of Reusable Facemasks for Use During an Influenza Pandemic, Prepub Apr 2006, Final Jun 2006
  - Prepub report received Jan 2007, Briefing Jan 2007, Final Mar 2007

• **Review of BLS Survey of Respirator Use**
  - Three open meetings in FY06
  - Prepub report received Dec 2006, Briefing Feb 2007, Final Apr 2007

• **National Academies Evaluation of Personal Protective Technology (PPT) Cross Sector**
  - National Academies evaluation Sept 2007
  - Site visit Nov 8, 2007
  - Stakeholder meeting Dec 17, 2007
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
NAS Review of the NIOSH/ BLS Respirator Use Survey

Charge to Committee

- Assess informational underpinnings of the NPPTL program to promote effective use of respirator equipment in the workplace

- Focus on the Bureau of Labor Statistics (BLS) and NIOSH 2001 Survey of Respirator Use and Practices (SRUP)
PPT Program Planning Input
COPPE Studies Requested by NPPTL
Review of BLS Survey of Respirator Use

- Three open meetings in FY06
- Prepub report received Dec 2006, Briefing Feb 2007, Final Apr 2007
- Dissemination to NIOSH Surveillance Coordination Group (SCG) Jan 2008

- Key Activities
  - FEB 13, 2008: Discussions with SCG
  - MAR 6, 2008: Stakeholder Meeting
  - APR 2008: Action Plan posted for comment
  - MAY 5-6, 2008: Action Plan presented to COPPE

- Action Plan implementation – FY 09 and beyond
NAS Review of the NIOSH/ BLS Respirator Use Survey

Committee Findings

- Inadequate funding for its scope and size.
- Insufficient documentation to fully understand the survey design and implementation.
- Disagreements between survey objectives and final survey questions related to inadequacies in instrument design, pre-testing and compromises that had to be made between cost and quality.
- Sample design problems, including a lack of precision objectives for key estimates of population subgroups.
- Data collection procedures that did not use state-of-the-art techniques to improve response rates, improve non-response follow-ups and enhance data quality.
- Problems with the calculations of standard errors.
- Limited efforts to disseminate survey findings and data to key stakeholders.
- Failure to conduct sample matching to improve the quality and richness of data.
State of PPT Program
Anthropometrics Research

• Respirator panel recommendations from anthropometric research serve as foundation to new respirator test panel for Total Inward Leakage and PPE sizing for today’s workforce

• Research findings to be used in:
  – Total Inward Leakage Program
  – Future certification activities
  – Human subject selections for research (workforce representation)

• National Academies review of Program provides “gold standard” review to assess findings and provide recommendations
PPT Program Planning Input

COPPE Studies Requested by NPPTL

Assessment of the NIOSH Head-and-Face
Anthropometric Survey of U.S. Respirator Users

• Three open meetings in FY06
• Jan 2006 – Mar 2006 - Support to HHS for Committee on the Development of Reusable Facemasks for Use During an Influenza Pandemic, Prepub Apr 2006, Final Jun 2006
• Prepub report received Jan 07, Briefing Jan 07, Final Mar 07
• Research Action Plan posted Aug 2007
• Action Plan comment period end Apr 2008
• Action Plan implementation – FY 08 and beyond
IOM Committee for the Assessment of the NIOSH Head-and-Face Anthropometric Survey of U.S. Respirator Users

Charge to Committee

• Review the NIOSH sponsored Anthrotech report entitled, “Assessment of the NIOSH Head-and-Face Anthropometric Survey of U.S. Respirator Users.”

• Examine the adequacy and validity of the NIOSH study, the data collected, and the recommended revisions to the set of facial characteristics that are to be used in testing the fit of respirators.

• Examine both the content and the form of the study, the appropriateness of its sample and its sample methodology, and the adequacy of the resultant data.

• Assess representativeness of diverse U.S. workforce and the adequacy of the anthropometric features and parameters considered in the revised panel.
Committee Findings and Recommendations

• The results are clear improvement over the anthropometric data and corresponding LANL fit-test face panels that have been used since the 1970s;

• NIOSH-sponsored Anthrotech study has a number of weaknesses that limit its effectiveness and reliability;

• Certain steps should be taken to address the weaknesses, in order to move toward more effective testing and certification of respirators in the future.
PPT Program Planning Input

NPPTL Contract Vehicle used for HHS Study
Development of Reusable Facemasks for use During an Influenza Pandemic

• Dec 2005
  – PPT Program worked with HHS to develop scope of work

• Jun 2006
  – Final report

• PPT Program Actions
  – Report served as input to validate several PPT Program research activities
    • PPT research to assess effective decontamination methods on filtering facepiece respirators (FFRs)
    • Metabolic Evaluation of N95 Respirator Use with Surgical Masks

  – No formal PPT Action Plan developed
Charge to the Committee on the Development of Reusable Facemasks for use During an Influenza Pandemic

Charge to Committee

• Multiple measures necessary to reduce impact of pandemic influenza.
  – Respirators and medical masks could help prevent or slow influenza transmission in absence of antivirals and vaccines

• Sufficient supplies of disposable masks and/or respirators may fall short in the event of a pandemic
  – HHS requested IOM examine reuse of medical masks and N95 respirators in the event of an influenza pandemic.
Charge to the Committee on the Development of Reusable Facemasks for use During an Influenza Pandemic

Committee Findings and Recommendations

• Very little is currently known regarding the potential to disinfect and reuse either medical masks or respirators.

• Fundamental research both in the epidemiology of influenza and in the material properties of medical masks and respirators is needed before methods of disinfection and reuse can be developed.

• In spite of that lack of research, the committee, in its expert opinion, was able to develop a method of use that may allow for extended use of an N95 respirator.
PPT Program Planning Input

Committee on PPE for the Workforce (COPPE)

• Three open meetings in FY06 and two in FY07 & FY08 and 1 in FY09
• Workshop: Feb 22, 2007 – PPE during an Influenza Pandemic: Research, Standards, Certification and Testing Directions
• Prepub report received Sep 2007, Briefing Sep 7, 2007
• First meeting FY08, Oct 8-9, 2007
  – NIOSH NPPTL Response to PPE for HCW Report
  – Stakeholder response to PPE for HCW report
    – CDC
    – Manufacturers
    – OSHA, JCAHO, FDA
• Action Plan Development
  – NIOSH NPPTL Response posted Feb 2008 for public comment
  – Updated and posted with docket response Mar 2009

http://www.cdc.gov/niosh/docket/NIOSHdocket0129.html
IOM Committee for Preparing for an Influenza Pandemic: PPE for HCW Workshop

• Charge to Committee

  – Urgent need to address the lack of preparedness regarding effective PPE for use in an influenza pandemic.

  – In 2006, NIOSH NPPTL funded the IOM to conduct a study on the PPE needed by healthcare workers in the event of an influenza pandemic.
IOM Committee for Preparing for an Influenza Pandemic: PPE for HCW Report

• Committee Findings and Recommendations

  – Three critical areas were identified that require expeditious research and policy action:

    • Understand influenza transmission

    • Commit to worker safety and appropriate use of PPE

    • Innovate and strengthen PPE design, testing, and certification
# Overview of IOM PPE for HCW Report

## Recommendations

### Understand Influenza Transmission
- [1] Initiate and support a global influenza research network

### Commit to Worker Safety and Appropriate Use of PPE
- [6] Emphasize appropriate PPE use in patient care and in healthcare management, accreditation, and training
- [7] Identify and disseminate best practices for improving PPE compliance and use
- [8] Increase research and research translation efforts relevant to PPE compliance

### Innovate and Strengthen PPE Design, Testing, and Certification
- [2] Define evidence-based performance requirements (prescriptive standards) for PPE
- [3] Adopt a systems approach to the design and development of PPE
- [4] Increase research on the design and engineering of the next generation of PPE
- [5] Establish measures to assess and compare the effectiveness of PPE
- [9] Ensure balance and transparency of standards-setting processes
- [10] Strengthen pre-market testing of PPE for healthcare workers
- [12] Coordinate efforts and expand resources for research and approval of PPE
NPPTL Program Related Activities for IOM PPE for Healthcare Workers

- Reusability of Filtering Facepiece Respirators
- Metabolic Evaluation of N95 Respirator Use with Surgical Masks
- Aerosol Generation by Cough (HELD/NPPTL)
- PAPR/N95 FFR Combination
- N95/P100 TIL Testing
- Project BREATHE
- Frequency of Fit Testing
- Development of Computer-Aided Face-Fit Evaluation Methods
- Penetration of Nanoparticles through NIOSH-approved Respirator Filters
- “No Fit Test” Respirator Workshop Nov 8, 2007
- Certified Product Investigation Process (CPIP)
- Industrial PAPR Module
- Total Inward Leakage (TIL)
- Improved Criteria for Emergency Medical Protective Clothing
Other NIOSH and CDC Related Activities for IOM PPE for Healthcare Workers

- Elastic Textile Solution Pilot for Prototype Masks (CDC)
- Personal Protective Equipment (PPE) Effectiveness Study (CDC)
- Expedient Patient Isolation for Bioterrorism and Epidemic Response (DART)
- Expedient Airborne Isolation for Emergency Response Exercises (DART)
- Provide worker guidance in addressing pandemic influenza and aerobiological workplace hazards through HHS pandemic influenza Response plan (DSHEFS)
- Working in collaboration with researchers at West Virginia University on a project to examine the potential for airborne transmission of influenza virus in a hospital emergency department (HELD/DRDS)
Process to Address PPT Program IOM Recommendations

IOM Recommendations

- Recommendation 1
- Recommendation 2
- Recommendation 3

Assess/Evaluate Recommendations

PPT Role

YES

Apprise Applicable Organizations

NO

Establish Response to PPT related IOM Recommendations

Develop Action Plans

Disseminate Action Plans
- Public meetings
- FRN
- One-on-one stakeholder meetings
- Website distribution
- Other venues (SDO, ISEA, etc.)

YES

Revise Action Plans

NO

Implement Action Plans

Current Activities

- Surveillance
- Research
- Policy and Standards
- Respirator Certification
- Outreach Activities
- Emergency Response
In a separate effort, NIOSH Committed to Evaluating Sector and Cross Sector Activities

- Sectors evaluated
  - Mining
  - Agriculture, Forestry and Fishing
  - Construction
- Cross sectors evaluated
  - Hearing Loss
  - Traumatic Injury
  - Respiratory Disease Research
  - Personal Protective Technology
  - Health Hazard Evaluation
Recommendations resulting from NA Evaluation of NIOSH PPT Program

Comprehensive National PPT Program

Centers of Excellence and extramural collaboration

Enhanced Respirator Certification Program

Research on use and usability of PPE

Assess PPT use and effectiveness using a lifecycle approach
PPT Program Implementation Plan Development

**PPT Initiatives**

- IOM Anthropometrics Report
- NAS Measuring Respirator Use Report
- IOM PPE Healthcare Worker Report
- Customer Satisfaction Surveys

**External Inputs**

- MINER Act
- Domestic Chemical Defense Implementation Plan
- IOM Reusability Report

**Flowchart**

1. NA Evaluation Report Received (June 25, 2008)
2. PPT Program Preplanning (Initiate: July 2008)
4. COPPE Oct 27, 2008
5. NIOSH OD Dec 7, 2008
6. BSC & Stakeholder Review Mar 19 – Apr 20, 2009
7. BSC Meeting Apr 16, 2009
National Academies’ Evaluation

PPT Scores

Impact = 4

The program has made some contributions to end outcomes or well-accepted intermediate outcomes.

Relevance = 4

The program’s work is in priority subject areas, and NIOSH is engaged in appropriate transfer activities for completed projects or reported results.

Recommendations

1. Implement and Sustain a Comprehensive National PPT Program
2. Establish PPT Research Centers of Excellence and Increase Extramural PPT Research
3. Enhance the Respirator Certification Process
4. Increase Research on the Use and Usability of PPT
5. Assess PPT Use and Effectiveness in the Workplace Using a Life-Cycle Approach

Emerging Issues

Continue research in priority areas

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
Lessons learned about working with standing committees to make them most effective in meeting our needs.
Maximize impact of COPPE meetings and input

• Inform Committee of current activities and approaches
• Provide input to current approaches to address gaps
• Discuss alternative approaches to address gaps
• Leverage scientific and medical expertise to identify the Nation’s PPE needs
• Identify appropriate scientific evaluations of activities
  – Anthropometrics
  – Surveillance
• Identify appropriate assessments to address needs
  – PPE for HCW
  – PPE Certification
  – Update to PPE for HCW initiatives
• Inform interested parties
  – VA Project BREATHE’
  – FDA Community use respirator
Quality Partnerships Enhance Worker Safety & Health

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

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Thank you

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