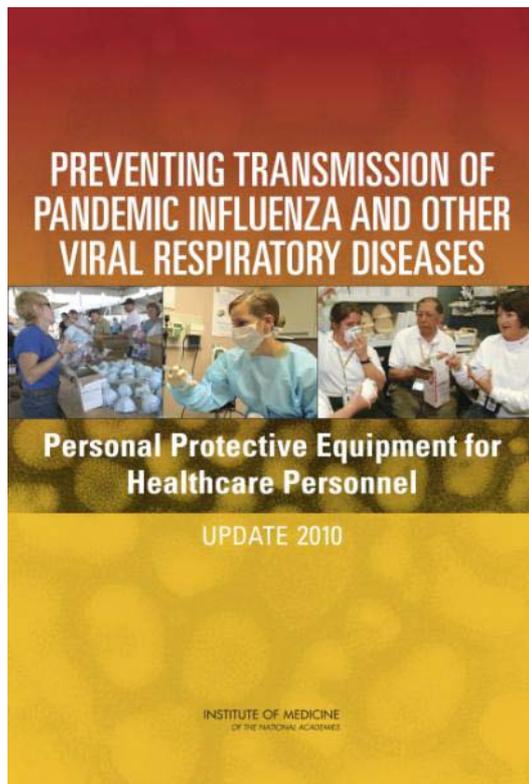


NIOSH PPT Program Stakeholder Meeting
Pittsburgh, PA
March 29, 2011

Bill Kojola
Safety and Health Department
AFL-CIO
Washington, DC

*Preventing Transmission
of Pandemic Influenza
and Other Viral
Respiratory Diseases:
Personal Protective
Equipment for
Healthcare Personnel
Update 2010*



INSTITUTE OF MEDICINE
OF THE NATIONAL ACADEMIES

Advising the nation/Improving health

IOM Committee

ELAINE L. LARSON (*Chair*), Columbia University

GLORIA ADDO-AYENSU, Fairfax County Department of Health

ALLISON E. AIELLO, University of Michigan School of Public Health

HOWARD J. COHEN, Professor Emeritus, University of New Haven

ROBERT COHEN, Cook County Health and Hospitals System, Stroger
Hospital of Cook County

KAREN COYNE, U.S. Army Edgewood Chemical Biologic Center

DAVID M. DEJOY, University of Georgia

KEN GALL, Georgia Institute of Technology

WILLIAM KOJOLA, AFL–CIO

ALLISON MCGEER, Mount Sinai Hospital, University of Toronto

PETER PALESE, Mount Sinai School of Medicine

DAVID PREZANT, Fire Department of the City of New York, Albert
Einstein College of Medicine

M. E. BONNIE ROGERS, University of North Carolina–Chapel Hill

RICHARD P. WENZEL, Virginia Commonwealth University

Statement of Task

The Institute of Medicine will convene an expert committee to examine current research directions and certification and testing issues regarding the use of personal protective equipment during an influenza pandemic. The study will focus on research and other relevant efforts conducted since the release of the Institute of Medicine report, *Preparing for an Influenza Pandemic: Personal Protective Equipment for Healthcare Workers*, in September 2007.

Issues to be addressed include updates on:

- Research needed to understand and improve the efficacy and effectiveness of personal protective equipment, particularly facemasks and respirators, for an influenza pandemic. Attention should be paid to research needed to improve functionality and to address human factor issues such as wearability, compliance, and communications.
- Necessary certification, testing, and standards development issues
- Priorities and resources for research and certification efforts.

A report will be issued that includes the committee's recommendations on next steps for research on personal protective equipment for use in an influenza pandemic.

Study Process

- **Three committee meetings** (February, June, September 2010)
- **Scientific workshop and public comment period** (in conjunction with the second committee meeting)
- **Workshop panels:**
 - Research on Influenza Transmission
 - Research on Advances in PPE Technology
 - PPE Implementation—Observational and Clinical Studies
 - PPE Implementation—Individual and Organizational Studies
 - PPE Implementation—International and U.S. Policy Research Perspective on the H1N1 Experience with PPE
 - Public Comment Period
- **Committee discussions with experts**
- **NRC Report Review:** 12 external reviewers; detailed response to reviewer comments with approval by review coordinator and monitor

Criteria for Decisions on PPE Selection and Use

Personal protective equipment for healthcare personnel should do the following:

- effectively reduce risks of disease or injury to healthcare personnel;
- minimize negative interactions with or effects on patients and their families and caregivers;
- be acceptable and usable by healthcare personnel in their daily tasks (including ease of communication and comfort);
- be practical regarding issues of cost, time, and training; and
- be appropriate to the occupational risk being encountered.

Transmission of Influenza and Other Viral Respiratory Diseases

Progress has been made in understanding the modes of transmission, but the relative contribution of the modes are still unclear.

Standardized terms, definitions, and classifications are needed to describe transmission routes and aerodynamic diameter of particles.

There have been some insights into the potential for influenza virus contamination of the healthcare environment through studies that examined

- environmental monitoring of air for influenza and
- the contamination of fomites and hands with H1N1.

Mathematical models have been developed to characterize the relative contribution of influenza transmission modes, but the available parameters are limited due to incomplete information on influenza viability and virus titers.

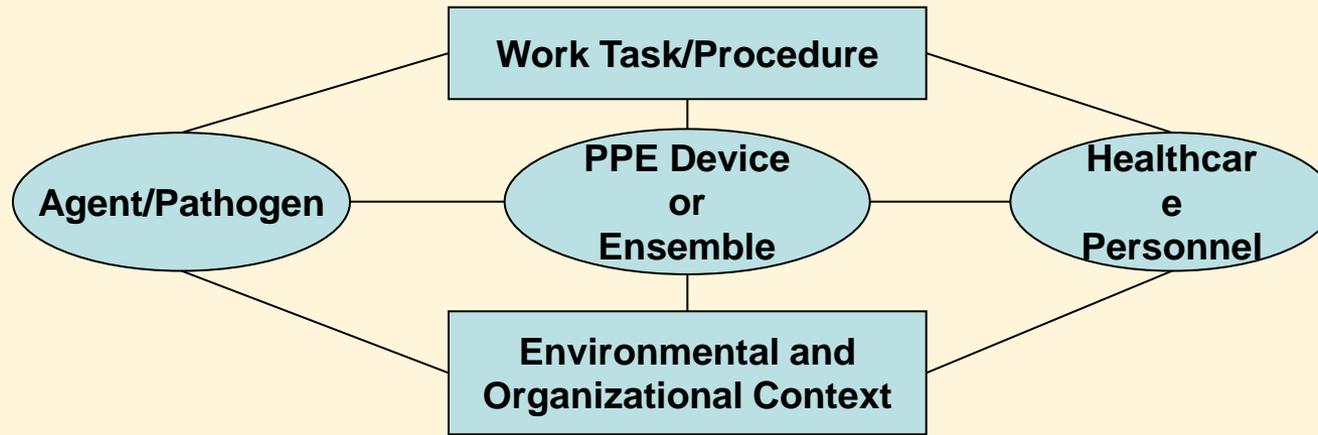
Designing and Engineering Effective PPE

Understanding the functional issues related to the design of PPE, as well as the factors that impact use, are critical.

Further research is needed in the following areas, particularly as they relate to use by healthcare personnel:

- the differences between respirators and face masks as well as their appropriate uses,
- design and engineering aspects of respirator fit and filtration,
- the role of face masks as PPE,
- the physiological impact of PPE other than respirators,
- integration issues concerning PPE and medical equipment and the impact on operational performance, and
- effective decontamination methods.

Using PPE: Individual and Organizational Issues



The committee recommends a four-pronged strategy for immediate implementation of PPE use in health care:

1. deliberate planning and preparation at the leadership and organizational levels;
2. comprehensive training, including supervisors and managers;
3. widespread and convenient availability of appropriate PPE devices; and
4. accountability at all levels of the organization.

Policy Research and Implementation

Challenges in the initial phases of an epidemic or pandemic:

- to determine PPE policy,
- to adapt the policy as information is gained, and
- to communicate the policy changes.

Lessons learned from the 2009 H1N1 and recent seasonal flu periods:

- Articles continue to be published, including information about the challenges and successes in providing PPE to healthcare personnel.
- Incorporating these lessons into research, policy, and practice efforts will be important.

Across the Spectrum of Research

Recommendation: Develop Standardized Terms and Definitions

CDC and OSHA, in partnership with other relevant agencies and organizations, should work to develop standardized terms, definitions, and appropriate classifications to describe transmission routes and aerodynamic diameter of particles associated with respiratory disease transmission. This effort should involve a consensus from the industrial hygiene, infectious disease, and healthcare communities.

Recommendation: Develop and Implement a Comprehensive Research Strategy to Understand Viral Respiratory Disease Transmission

The National Institutes of Health, in collaboration with other research agencies and organizations, should develop and fund a comprehensive research strategy to improve the understanding of viral respiratory disease transmission, including, but not limited to, examining the characteristics of influenza transmission, animal models, human challenge studies, and intervention trials. This strategy should include

- an expedited mechanism for funding these types of studies and
- clinical research centers of excellence for studying influenza and other respiratory virus transmission.

Safety to Efficacy:

Recommendation: Continue and Expand Research on PPE for Healthcare Personnel

NPPTL and other agencies, private sector companies, and other organizations should continue to advance research in designing and evaluating the effectiveness of respirator protection for healthcare personnel and expand its research efforts to improve and evaluate the effectiveness of gloves, gowns, face shields, and face masks in preventing the transmission of influenza or other viral respiratory diseases. Areas of focused research needs include

- effectiveness in preventing fomite, droplet spray, or aerosol transmission;
- decontamination and reusability;
- comfort, fit, and usability;
- impact on task performance; and
- development of technologies specifically for healthcare personnel.

Safety to Efficacy:

Recommendation: Examine the Effectiveness of Face Masks and Face Shields as PPE

NPPTL should investigate the effectiveness of face masks and face shields in preventing transmission of viral respiratory diseases.

Recommendation: Improve Fit-Test Methods and Evaluate User Seal Checks

NPPTL should develop novel, simpler fit-test methods and evaluate the effectiveness of performing user seal checks on N95 respirators.

Efficacy to Effectiveness:

Recommendation: Explore Healthcare Safety Culture and Work Organization

NIOSH and other relevant agencies, such as the Agency for Healthcare Research and Quality, and professional organizations should conduct research to better understand the role of safety culture and other behavioral and organizational factors on PPE usage in healthcare settings. These efforts should include

- **conducting human factors and ergonomics relevant to the design and organization of healthcare work tasks to improve worker safety by reducing hazardous exposures and effectively using PPE (e.g., reduce unnecessary PPE donning and doffing),**
- **exploring the links between patient safety and healthcare worker safety and health that are relevant to the use of PPE, and**
- **identifying and evaluating strategies to mitigate organizational barriers that limit the use of PPE by healthcare personnel.**

Efficacy to Effectiveness:

Recommendation: Identify and Disseminate Effective Leadership and Training Strategies and Other Interventions to Improve PPE Use

NIOSH and other relevant agencies and professional organizations should support intervention effectiveness research to assess strategies, including innovative participatory approaches to training, for healthcare and supervisory staff at all levels to improve PPE usage and other related outcomes across the range of healthcare settings. To identify best practices, efforts should be made to

- **conduct observational studies of PPE use by healthcare personnel in different types of work settings;**
- **develop, implement, and evaluate comprehensive leadership and training strategies and interventions that go beyond simple knowledge-based training;**
- **design training interventions specifically for supervisory and managerial personnel in different types of healthcare settings;**
- **examine long-term practice change and safety culture implementation related to educational interventions;**
- **improve use and understanding of PPE by home and community healthcare personnel;**
- **develop assessment tools and metrics that take a broader approach to PPE and acknowledge the interaction of worker, task, and environmental factors; and**
- **be informed by a lessons-learned summit on PPE use by healthcare personnel during the 2009 H1N1 experience.**

Effectiveness to Disease Reduction in Populations:

Recommendation: Develop and Certify Powered Air-Purifying Respirators (PAPRs) for Healthcare Personnel

NPPTL should develop certification requirements for a low-noise, loose-fitting PAPR for healthcare personnel.

Recommendation: Move Forward on Better Fitting Respirators

NPPTL should continue rule making for total inward leakage regulations that require respirators to meet fit criteria. To improve consumer and purchaser information on fit capabilities, NIOSH should establish a website to disseminate fit-test results for specific respirator models on an anthropometric (NIOSH) test panel, where such data exist.

Effectiveness to Disease Reduction in Populations:

Recommendation: Clarify PPE Guidelines for Outbreaks of Novel Viral Respiratory Infections

NIOSH, other divisions of the Centers for Disease Control and Prevention (CDC), the Occupational Safety and Health Administration (OSHA), and other public health agencies should develop a coordinated process to make, announce, and revise consistent guidelines regarding the use of PPE to be worn by healthcare personnel during a verified sustained national/international outbreak of a novel viral respiratory infection. The agencies should tailor their guidance in a timely and coordinated manner as the virulence, contagiousness, and affected populations are further characterized.

Effectiveness to Disease Reduction in Populations:

Recommendation: Standards and Certification for Face Masks and Face Shields

NIOSH, OSHA, and standards-development organizations should develop the standards and certification processes needed to assess the performance of face masks and face shields as PPE. The development of standards and certification processes should be guided by research regarding their efficacy as PPE:

- **OSHA and CDC should clarify that face masks are governed by the general PPE standard (29 CFR 1910.132) and not by the respiratory protection standard (29 CFR 1910.134).**
- **NIOSH should work with other agencies and standards-setting organizations to develop voluntary consensus standards and independent third-party testing and certification processes for face shields and face masks with specific tests for assessing prevention of transmission of viral respiratory diseases.**

Effectiveness to Disease Reduction in Populations

Recommendation: Establish PPE Regulations for Healthcare Personnel

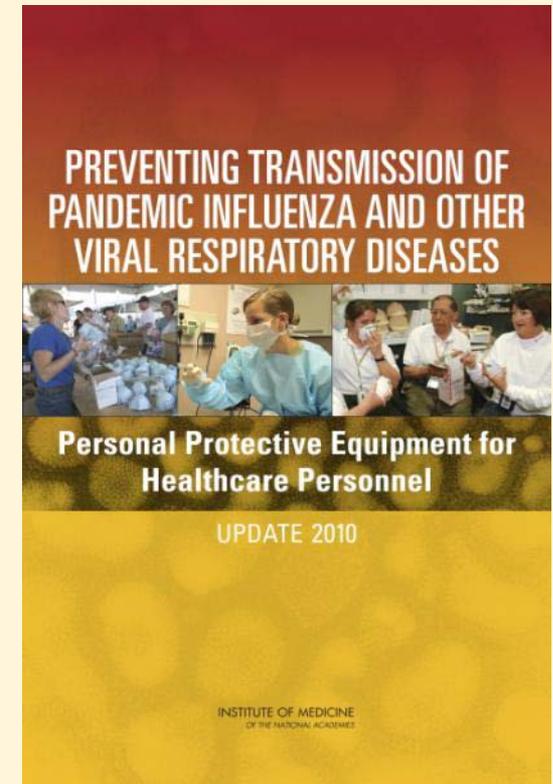
The CDC, including NIOSH, and OSHA should develop and promulgate guidelines and regulations that are consistent regarding the use of PPE by healthcare personnel for influenza and other viral respiratory diseases:

- To assist employers in complying with the OSHA PPE standard, OSHA should specify the voluntary consensus standards that are required to be met for non-respirator PPE (e.g., gowns, gloves, face shields, face masks) in the event of influenza and other viral respiratory diseases.
- OSHA, with input from the CDC and other agencies and organizations, should work toward promulgating an aerosol-transmissible diseases standard that would include prevention of the transmission of influenza and other viral respiratory diseases.

Institute of Medicine Report

The IOM report is available for
free download:

The National Academies Press
www.nap.edu



INSTITUTE OF MEDICINE
OF THE NATIONAL ACADEMIES

Advising the nation / Improving health