

Compendium of NIOSH Health Care Worker Research

2001

DEPARTMENT OF HEALTH AND HUMAN SERVICES
Centers for Disease Control and Prevention
National Institute for Occupational Safety and Health
Cincinnati, Ohio

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Preface

The purpose of this publication is to provide an overview of current research projects that are conducted or funded by the National Institute for Occupational Safety and Health (NIOSH) that focus on reducing work-related hazards in the health care industry. These projects have been divided into three main categories:

- Research projects focused on achieving a better understanding of workplace hazards.
- Intervention projects intended to develop prevention strategies for creating a safer work environment.
- Surveillance projects to collect, analyze, and interpret data for use in establishing priorities for investigation and intervention.

The research projects have been further subdivided according to their particular area of study within these categories:

- Biological hazards studies focus on health care workers' occupational exposures to the human immunodeficiency virus (HIV) and other bloodborne pathogens (BBP), *Mycobacterium tuberculosis* (TB), respiratory diseases, and several other biological hazards.
- Chemical hazards research projects concern health care workers occupational exposures to natural rubber latex (NRL), glutaraldehyde, ethylene oxide (EtO), and other hazardous chemicals.
- Physical hazards studies examine the effects of physical stressors or physical work factors, ionizing/nonionizing radiation, and violence in the workplace.
- Psychosocial hazards research projects examine the possible occupational hazards that health care workers may encounter due to factors such as work schedules and socioeconomic position.

At the end of the document, projects that are focused on a specific health care worker population (e.g., home health care worker) or a particular workplace setting (e.g., dental office) are listed for ease in identifying projects related to specific interests.

NIOSH-funded health care worker projects are either conducted by NIOSH researchers or in cooperation with outside research institutions, or through research grants. Those projects being conducted through the NIOSH grant program have the Principal Investigator listed as the project contact. All other projects list the NIOSH researcher as the project contact.

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Abbreviations

AIDS	Acquired Immunodeficiency Syndrome
AZT	Zidovudine
BBP	Bloodborne pathogens
BJS	Bureau of Justice Statistics
CDC	Centers for Disease Control and Prevention
CNAs	Certified Nursing Assistants
DHHS	Department of Health and Human Services
DNA	Deoxyribonucleic acid
EtO	Ethylene oxide
FDA	Food and Drug Administration
HHEs	Health Hazard Evaluations
HIV	Human Immunodeficiency Virus
MSDs	Musculoskeletal disorders
NCI	National Cancer Institute
NCVS	National Crime Victimization Survey
NEWS	National Exposures-at-Work Survey
NIEHS	National Institute of Environmental Health Sciences
NIOSH	National Institute for Occupational Safety and Health
NRL	Natural rubber latex
OR	Operating room
OSHA	Occupational Safety and Health Administration
PVC	Polyvinyl chloride
PEpline	National Clinicians Post-Exposure Prophylaxis Hotline
REL	Recommended Exposure Limit
RN	Registered Nurse(s)
TB	Tuberculosis
VHA	Veterans Health Administration
WoRLD	Work-Related Lung Disease

Acknowledgments

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Workplace Hazards: *Biological*

Bloodborne Pathogens

Best Practices Demonstration Project

CONTACT: Janice Huy
AFFILIATION: National Institute for Occupational Safety and Health
Division of Surveillance, Hazard Evaluations and Field Studies
(513) 841-4428

KEYWORDS: Health care workers, intervention, Human Immunodeficiency Virus (HIV)

RESEARCH SUMMARY:

The purpose of this project is to characterize the steps involved in selecting and evaluating safer medical devices in health care facilities and then sharing that information with others. A number of hospitals, home health agencies, nursing homes, and dental offices will be identified and recruited to work through the process of selecting, evaluating, and implementing safer medical devices within their facilities. These health care facilities will fully document the process undertaken and report back to the National Institute for Occupational Safety and Health (NIOSH) on how each step was accomplished, what barriers were encountered and how they were overcome, and what lessons were learned. Through these health care facilities, NIOSH will learn what it takes to implement an effective needlestick prevention program. This information will be shared with others via the NIOSH Web site.

Bloodborne Exposure Management

CONTACT: Robyn Gershon
AFFILIATION: Columbia University
New York City, New York
(212) 305-1186

KEYWORDS: HIV, infectious disease, work organization

RESEARCH SUMMARY (Excerpted from Principal Investigator's description):

This is a collaborative, multidisciplinary, cross-sectional study designed to characterize and assess employee compliance with the Public Health Service Guidelines for the management of bloodborne exposures. The purpose of the study is to identify barriers related to compliance that might hinder employees in receiving recommended post-exposure care. This study will identify barriers to appropriate implementation of the Guidelines and allow us to focus our energies and resources on specific improvements in order to minimize the risk of infection to exposed employees.

Evaluation of Traumatic Injuries in Health Care Workers During Surgery

CONTACT: Denise Korniewicz
AFFILIATION: University of Maryland
Baltimore, Maryland
(202) 678-5154

KEYWORDS: Acquired Immunodeficiency Syndrome (AIDS), hazards, health care workers

RESEARCH SUMMARY (Excerpted from Principal Investigator's description):

Recent increases in the rate of needlestick/sharps injuries and exposure to bloodborne pathogens (BBP) have been reported to be greater than 50% in health care workers who work in the operating room (OR) as compared to other healthcare settings. This study will utilize an alternating block design (four, six-month blocks) to: 1) investigate the factors associated with needlestick/sharp injury during a surgical episode; and 2) evaluate specific surgical factors (length of surgery, surgical instrumentation, handedness, use of indicator gloves for needlestick/sharp injury, sequence of surgical cases) that impact on the rate of needlestick/sharp injury among health care workers during surgery. Analysis of the study data will be used to determine the factors predictive of needlestick/sharps injuries to OR personnel.

Genetic Variation in Metabolism of AZT

CONTACT: Ainsley Weston
AFFILIATION: National Institute for Occupational Safety and Health
Health Effects Laboratory Division
(304) 285-6121

KEYWORDS: Genetics, infectious disease, HIV

RESEARCH SUMMARY:

In the event of occupational exposure to a source of BBP, caregivers, medical technicians, public safety workers, and others receive chemoprophylaxis for HIV infection in the form of zidovudine (AZT) or other antiviral agents. Blood cell deoxyribonucleic acid (DNA), AZT levels, chromosomal aberration, hypoxanthine guanine ribosyltransferase and glycophorin-A mutations, AZT glucuronidation, and phosphorylation in persons treated with AZT vary widely. Genetic polymorphisms in thymidine kinase, thymidylate kinase, pyrimidine nucleoside diphosphate kinase, and UDP-glucuronosyltransferase are likely responsible for these variations. This project will seek correlations between these genotypes and toxic and mutagenic end-points in 300 AZT-treated persons. This knowledge will help clinicians to make more informed risk/benefit decisions about AZT use in prophylaxis, and will enable them to tailor treatment to individuals following occupational exposures.

HIV Information Dissemination Demonstration Project

CONTACT: Ray Sinclair
AFFILIATION: National Institute for Occupational Safety and Health
Education and Information Division
(513) 533-8302

KEYWORDS: Information, health care workers, HIV

RESEARCH SUMMARY:

The purpose of this project is to conduct a community-based, demonstration-oriented health communication intervention to raise awareness of health care workers and administrators about NIOSH recommendations regarding BBP. Specifically, the project addresses prevention of needlestick injuries through use of safer medical devices, increased adoption of related prevention behaviors by workers, and administrators' policy decisions and buying behaviors. The project is underway in Columbia, South Carolina.

National Clinicians' Post-Exposure Prophylaxis Hotline

CONTACT: Janice Huy
AFFILIATION: National Institute for Occupational Safety and Health
Division of Surveillance, Hazard Evaluations and Field Studies
(513) 841-4428

KEYWORDS: HIV, bloodborne pathogens, technical assistance

RESEARCH SUMMARY:

The purpose of this project is to provide partial support to the National Clinicians' Post-Exposure Prophylaxis Hotline (PEpline). The PEpline offers health care providers around-the-clock advice on managing occupational exposures to HIV, hepatitis B, and hepatitis C.

Needlestick Injuries in Healthcare Settings

CONTACT: Guang Chen
AFFILIATION: National Institute for Occupational Safety and Health
Division of Safety Research
(304) 285-5894

KEYWORDS: Injury prevention, health care workers

RESEARCH SUMMARY:

This study is a follow-up telephone interview using a national, probability-based sample of U.S. hospital emergency departments. Survey questions focus on occupational exposures to BBP, safety training, and availability and use of safer medical devices among injured/exposed workers, both in hospital and non-hospital settings. The expected outcomes include a better understanding of the type of incidents of BBP exposures being treated in emergency departments, as well as information on safety training and availability and use of safer medical devices in each industry. Results will contribute to an understanding of the risk of BBP exposures in non-hospital settings, and to the development of effective intervention strategies for both hospital and non-hospital settings.

Outcomes of the Revised California Bloodborne Pathogens Standard

CONTACT: Marion Gillen
AFFILIATION: University of California
San Francisco, California
(415) 476-1382

KEYWORDS: Infectious disease, intervention, effectiveness research

RESEARCH SUMMARY (Excerpted from Principal Investigator's description):

In California, a revised BBP standard that mandates that health care facilities use safer medical devices became effective July 1, 1999. This provides an excellent opportunity to evaluate the impact of the standard with the following specific aims: 1) to assess facility compliance as measured by the BBP Standard Compliance Checklist, as well as barriers to and facilitators of compliance; 2) to determine the number of needlesticks in health care facilities for the years 1998–2001; 3) to assess employee perceptions of workplace safety as measured by the Safety Climate Measure for health care and to determine the relationship between safety climate and compliance; and 4) to determine facility costs before and after adoption of this standard.

Surveillance of Bloodborne Pathogens

CONTACT: Winifred Boal
AFFILIATION: National Institute for Occupational Safety and Health
Division of Surveillance, Hazard Evaluations and Field Studies
(513) 841-4428

KEYWORDS: Injuries, health care workers, HIV

RESEARCH SUMMARY:

The purpose of this project, which is being conducted as a cooperative agreement, is to develop information to help decrease the incidence of exposure to BBP of health care workers employed in non-hospital settings. The immediate goals are to: 1) estimate the incidence of exposure to blood, particularly the incidence rate of needlestick and sharps injuries among health care workers who work in non-hospital settings; 2) identify risk factors for these injuries; and 3) estimate the prevalence of safer medical device availability and usage among these workers. The expected outcome is a report describing this information, presenting the results of analyses to identify the major risk factors, and potentially identifying factors for future intervention activities to reduce these exposures.

Website for Occupational HIV Resources

CONTACT: Janice Huy
AFFILIATION: National Institute for Occupational Safety and Health
Division of Surveillance, Hazard Evaluations and Field Studies
(513) 841-4428

KEYWORDS: HIV, control technology, dissemination

RESEARCH SUMMARY:

The purpose of this project is to develop, maintain, and promote an integrated and coordinated Web site featuring Centers for Disease Control and Prevention (CDC)-developed materials related to the prevention of HIV in the workplace. The usefulness of the Web site will be periodically evaluated.

Tuberculosis

Characterization of Tuberculosis Aerosols and Implications on Controls

CONTACT: Paul Jensen
AFFILIATION: National Institute for Occupational Safety and Health
Division of Respiratory Disease Studies
(304) 285-5749

KEYWORDS: Respirators, health care workers, tuberculosis (TB)

RESEARCH SUMMARY:

This project addresses three research gaps identified during the NIOSH TB strategic planning process. As a first step, the aerosol size distribution of cough aerosols, which have been characterized in both laboratory and field studies, will be reproduced in the bioaerosol chamber. Secondly, laboratory studies will be conducted to evaluate the effectiveness of surgical masks in preventing wearers from generating aerosol-containing, viable TB bacteria. Finally, through laboratory studies, field studies, and computer simulations, the efficacy of using 95% efficient filters in ventilation systems of health care facilities will be evaluated. The results will be used by health care workers, health professionals, the Occupational Safety and Health Administration (OSHA), the World Health Organization, correctional facility workers, and others to identify, modify, and implement appropriate preventative controls.

New Approaches to Medical Screening for Latent Tuberculosis

CONTACT: David Weissman
AFFILIATION: National Institute for Occupational Safety and Health
Health Effects Laboratory Division
(304) 285-6121

KEYWORDS: TB, health care workers

RESEARCH SUMMARY:

Latent TB infection occurs when an infected individual has controlled the infection and is asymptomatic, but has not eliminated the infection. Without treatment, latent infection can progress to active infection and the ability to infect others by cough aerosol. Prophylactic antimicrobial therapy can prevent the progression from passive to active disease. There is considerable need for better ways to screen for latent TB infection in populations at risk. The tuberculin skin test is not an optimal method for a variety of reasons. This project will evaluate the usefulness of a laboratory test to detect latent TB infection by measuring cell-mediated immunity to TB. Features of the immune response to TB mounted by peripheral blood cells in vitro will be characterized and used in efforts to further improve test performance. Overall, these studies will facilitate improved approaches to medical screening and surveillance for latent TB infection that can be used to prevent the occupational transmission of TB.

Respirator Efficacy versus Tuberculosis Aerosols

CONTACT: John Koerner
AFFILIATION: Johns Hopkins University
Baltimore, Maryland
(202) 237-5865

KEYWORDS: Respirators, health care workers, TB

RESEARCH SUMMARY (Excerpted from Principal Investigator's description):

The ultimate goal of this research is to protect health care and corrections workers from occupational exposure to *Mycobacterium tuberculosis* by defining the performance of respiratory protection with respect to mycobacterium aerosols. The specific aims are: 1) to determine the density of the droplet nuclei that result from the aerosolization of solutions containing *M. tuberculosis*; 2) to determine the particle size distribution and particle shapes characteristic of the aerosol generated by the cough of humans infectious with TB; 3) to explore a new bioaerosol analytical technique that incorporates the new firefly luciferase assay for mycobacterium; 4) to determine the leak characteristics of respiratory protection with respect to mycobacterium aerosols using a method that incorporates inhalation and exhalation into the respirator performance test; and 5) to determine what, if any, differences in respirator performance result when respirators are challenged with a standard aerosol [i.e. NaCl, dioctyl phthalate], and *M. tuberculosis* aerosols. Adequately characterized respirator function will assist the government, employers, and contacts in developing protective, useable, and cost effective respiratory protection programs for protection against TB. This will reduce the risk of TB infection associated with work in these areas.

TB Respirator Training Video for Health Care Workers

CONTACT: Carol Merry Stephenson
AFFILIATION: National Institute for Occupational Safety and Health
Education and Information Division
(513) 533-8302

KEYWORDS: TB, health care workers, respirators

RESEARCH SUMMARY:

Through this project, NIOSH developed a video designed to accompany or supplant a NIOSH text-based booklet, DHHS/NIOSH Publication No. 96-102, *Protect Yourself Against Tuberculosis – A Respiratory Protection Guide for Health Care Workers*. The booklet has been in widespread use among health care workers. The video was developed to better illustrate concepts difficult to convey through print. It describes respirator selection options, proper fit and use of respirators, and maintenance and care issues of concern to health care workers. A customer satisfaction evaluation of the product is underway.

Video Enhancement for TB Program Administrator's Guide

CONTACT: Carol Merry Stephenson
AFFILIATION: National Institute for Occupational Safety and Health
Education and Information Division
(513) 533-8302

KEYWORDS: Respirators, health care workers, prevention strategies

RESEARCH SUMMARY:

Health care administrators indicated a need for materials that would facilitate their ability to establish and maintain an effective medical facility respiratory protection program. Through this project, a video was developed to further illustrate concepts such as fit-testing that are discussed in the NIOSH text, *TB Respiratory Protection Program in Health Care Facilities: Administrator's Guide*. The video is meant to accompany the text. The video will be evaluated by end users.

Other Hazards

A Program to Estimate the Risk of Occupational Infectious Diseases in State Correctional Facilities

CONTACT: Douglas Trout
AFFILIATION: National Institute for Occupational Safety and Health
Division of Surveillance, Hazard Evaluations and Field Studies
(513) 841-4428

KEYWORDS: Hepatitis, TB, prisons

RESEARCH SUMMARY:

This project will evaluate the risk of occupational transmission of TB and BBP to health care workers employed in state prison settings, and will identify and evaluate prevention strategies in the unique prison setting. The specific aims are to: 1) estimate hepatitis B and hepatitis C prevalence and point prevalence of TB skin reactivity among state-based prison health care workers and determine compliance with hepatitis B vaccination recommendations; 2) identify unique risk factors associated with occupational transmission of infectious disease; 3) assess the costs associated with existing prevention strategies; and 4) identify barriers to compliance and develop risk reduction strategies. This project will improve the understanding of the occupational risks to correctional health care workers and will improve strategies for risk reduction.

Workplace Hazards: Chemical

Ethylene Oxide

Evaluating Exposures Under OSHA's 1984 Ethylene Oxide Standard

CONTACT: Robert Herrick
AFFILIATION: Harvard University
Boston, Massachusetts
(617) 432-0674

KEYWORDS: Health care workers, ethylene oxide (EtO), OSHA

RESEARCH SUMMARY (Excerpted from Principal Investigator's description):

This project consists of a historical evaluation of worker exposures under the OSHA 1984 EtO standard. Most workers with a potential for exposure to EtO are women employed in the hospital sector, where EtO is used to sterilize medical devices. The project's specific aims include characterization of EtO exposures, identification of potential determinants of EtO overexposures, and assessment of compliance with the EtO standard.

Latex

Assessing Latex Avoidance on Occupational Sensitization

CONTACT: Robert Brown
AFFILIATION: Johns Hopkins University
Baltimore, Maryland
(410) 955-3612

KEYWORDS: Latex, dermatitis, allergies

RESEARCH SUMMARY (Excerpted from Principal Investigator's description):

The purpose of this project is to develop, institute, and validate a program for hospital-based occupational latex allergy diagnosis, monitoring, and prevention that can also be utilized by other health care facilities. To this end, using state-of-the-art serology, skin testing, and glove provocation testing, the project will: 1) determine the initial prevalence of type I latex sensitization in high-risk OR health care workers; 2) assess the effectiveness of our avoidance intervention in converting our hospital to a latex-safe workplace by taking longitudinal measurements in latex-sensitized individuals, and the occupational latex exposure in the ORs by measuring the extractable and airborne latex allergen levels in NRL gloves used by the surgeons and nurses; 3) identify potential genetic markers for latex allergy; and 4) develop a generic protocol to facilitate conversion of any hospital to a latex-safe environment. By validating a program for hospital-based occupational latex allergy diagnosis, monitoring, and prevention, this project should result in a framework useable by hospitals throughout the United States to assist them in converting to a latex-safe environment.

Evaluation of Health Care Worker Glove Protection

CONTACT: Elena Page
AFFILIATION: National Institute for Occupational Safety and Health
Division of Surveillance, Hazard Evaluations and Field Studies
(513) 841-4428

KEYWORDS: Latex, personal protective equipment, gloves

RESEARCH SUMMARY:

This project, being conducted as a cooperative agreement, will assess the efficacy and acceptability of latex and nonlatex gloves in providing barrier protection from exposure to BBP as well as from chemicals commonly encountered in the health care setting. Results from this project will be useful to NIOSH in making recommendations to health care workers in selecting the correct gloves for specific procedures, and may be useful to the Food and Drug Administration (FDA) in developing standards for medical gloves.

Immunologic Methods for Assessment of Workplace Exposures to Natural Rubber Latex

CONTACT: David Weissman
AFFILIATION: National Institute for Occupational Safety and Health
Health Effects Laboratory Division
(304) 285-6121

KEYWORDS: Latex, exposure assessment, allergies

RESEARCH SUMMARY:

This project seeks to develop standardized approaches to measuring NRL allergens in the environment. Allergy to NRL has become a major occupational illness of health care workers, as well as a very significant problem for heavily exposed patient populations such as children with spina bifida. The allergy can have very significant consequences for affected individuals. Fortunately, the potential exists to prevent this disease by limiting exposure to NRL allergens. However, to set recommended exposure limits and monitor the effectiveness of measures to prevent exposure, it is necessary to have a standard, reproducible way to measure exposure. Thus, the main purpose of this project is to develop NRL allergen measurements suitable for environmental monitoring. In addition, these measurements will be used to assess the potential usefulness of decontamination procedures.

Natural Rubber Latex in Veterans Administration Health Care Workers

CONTACT: Ahmed Gomaa
AFFILIATION: National Institute for Occupational Safety and Health
Division of Surveillance, Hazard Evaluations and Field Studies
(513) 841-4428

KEYWORDS: Health care workers, hospitals, latex

RESEARCH SUMMARY:

Allergy to NRL is an important occupationally related problem for health care workers. Symptoms caused by this allergy can range in severity from mild to life-threatening and career-ending. Although much is already known about prevention and management of NRL allergy, important gaps in our knowledge remain. Even the prevalence and incidence of the problem is controversial. This study will determine the prevalence and incidence of NRL allergy, as well as risk factors associated with NRL allergy, in a large population of health care workers employed by the Veterans Health Administration (VHA). Data collected will also allow us to study best approaches to screening for NRL allergy, as well as document the medical and socioeconomic consequences of this condition. These findings will help us to refine and improve current approaches to prevention, surveillance, and management of NRL allergy.

Percutaneous Absorption of Latex Proteins

CONTACT: B. Jean Meade
AFFILIATION: National Institute for Occupational Safety and Health
Agriculture and Immunotoxicology Group
(304) 285-5854

KEYWORDS: Latex, skin, dermal penetration

RESEARCH SUMMARY:

This project has established an in vitro percutaneous penetration model to investigate the role of the skin in the development of latex allergy. Studies with human surgical tissue and hairless guinea pig skin have demonstrated that hairless guinea pig skin is a good surrogate for human skin. Latex proteins have been shown to penetrate the skin with approximately 1 percent penetrating intact skin and up to 30 percent penetration seen when the skin is abraded. Investigations are currently underway to determine the correlation between individual protein penetration and the differential serum recognition among various exposure groups. Studies are also underway to evaluate the effects of contaminants found in the health care environment on the skin barrier and how this affects latex protein penetration. Information gained from in vitro and in vivo penetration experiments will be useful in developing intervention strategies to prevent latex sensitization.

Preventing Occupational Latex Allergy in Health Care Workers

CONTACT: Edward Petsonk
AFFILIATION: National Institute for Occupational Safety and Health
Division of Respiratory Disease Studies
(304) 285-5749

KEYWORDS: Allergies, latex, health care workers

RESEARCH SUMMARY:

Allergy to NRL is recognized as an important occupational health problem that is prevalent among health care workers, many of whom are female nurses and aides. It can result in serious (and sometimes fatal) health and personal consequences. This project funds a five-year cooperative agreement between NIOSH, the National Institute of Environmental Health Sciences (NIEHS), and two large urban hospitals to investigate the prevalence and incidence of latex allergy among health care workers, while establishing and evaluating a comprehensive intervention program for protecting workers at risk.

Role of Dextran Powder in Latex Hypersensitivity

CONTACT: B. Jean Meade
AFFILIATION: National Institute for Occupational Safety and Health
Agriculture and Immunotoxicology Group
(304) 285-5854

KEYWORDS: Latex allergy, glove powder, immunomodulation

RESEARCH SUMMARY:

Dextran glove powder has been shown to bind and, when aerosolized, act as a carrier for latex proteins, thereby, increasing the potential for respiratory tract exposure. This study is aimed at evaluating the potential immunomodulatory role of glove powder and contaminants associated with glove powder in latex allergy. The mitogenicity of naïve dextran, as well as dextran recovered from powder gloves, is being investigated. The potential for dextran to act as an adjuvant in the development of the IgE response to latex proteins is being studied in animal models by inhalation exposure to latex alone, dextran powder alone, and a combination of latex and dextran. Glove powder is contaminated with endotoxin, which has been shown to have an immunomodulatory effect on the production of latex-specific IgE by inducing a class switch to IgG2a. The cytokine modulation induced by endotoxin to determine the mechanism of this effect is also being studied.

Role of the Route of Exposure in the Development of Latex Hypersensitivity

CONTACT: B. Jean Meade
AFFILIATION: National Institute for Occupational Safety and Health
Agriculture and Immunotoxicology Group
(304) 285-5854

KEYWORDS: Latex allergy, route of exposure, murine models

RESEARCH SUMMARY:

This project has led to the development of murine models to investigate mechanisms of latex sensitization and to evaluate potential intervention strategies. Mice have demonstrated the ability to mount a latex-specific IgE response following topical, subcutaneous, and respiratory tract exposure. Using these models, latex sensitized mice are being further evaluated for specific and non-specific pulmonary reactivity. Much of the effort is focused on better understanding the role of dermal exposure to latex proteins on the development of respiratory tract symptoms. Investigations are also being conducted to determine the immunomodulatory effects of co-exposure to contaminants in the health care environment, such as glutaraldehyde on the development of an IgE response to latex proteins.

Trends in Latex Antibody Prevalence among Health Professionals

CONTACT: Lynne Pinkerton
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KEYWORDS: Latex, allergies, health care workers

RESEARCH SUMMARY:

The purpose of this study is to document trends in latex allergy among health care workers over time. It is hypothesized that increasing use of latex gloves in the health care industry (due to the institution of universal precautions, as well as possible changes in glove manufacture and characteristics in relation to increased demand) may be responsible for an increasing prevalence of latex allergy among health care workers. However, there are little or no data documenting trends in latex allergy over time. This project will examine trends in latex sensitization by measuring serum antibodies to latex in stored serum obtained between 1976 and 1997 from physicians entering the CDC's Epidemic Intelligence Service. The study will provide data to address the potential association between trends in latex sensitization and latex glove use.

Validation Studies in Occupational Immunotoxicology

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KEYWORDS: Latex, biological monitoring, exposure assessment

RESEARCH SUMMARY:

This project addresses real-world problems in occupational immunotoxicology. Currently, efforts focus on worker exposure to latex proteins and the fungus *Stachybotrys chartarum*. In this project, individuals who are sensitive to latex will be exposed to latex proteins by puncture skin testing to determine which specific proteins are most important for the production and elicitation of latex allergy. Successful identification of the specific proteins will make it possible to develop better in vitro tests, identify which proteins should be removed from latex gloves, give insight into therapeutic intervention (desensitization injections), and generally allow for enhanced intervention measures to significantly lower the incidence of latex allergy. A second effort will be the development of a biological monitoring method to assess exposure to *S. chartarum*, the causative agent of “black mold disease.” Complaints of this disease have increased in recent years due to major floods and the use of construction procedures which allow for little fresh air exchange.

Other Hazards

Antineoplastic Drug Exposure: Effectiveness of Guidelines

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KEYWORDS: Health care workers, biomarkers, exposure assessment

RESEARCH SUMMARY:

The objective of this project is to assess exposure of health care workers to antineoplastic agents by employing a battery of biomarkers. Biomarkers are important to determine if there are effects related to exposure, especially if the biomarkers that are used occur before the disease can be diagnosed. The effects of chronic, low-level exposure are unknown and will be addressed in this project by examining a number of biomarkers and health effects.

Exposure to Surgical Smoke in Operating Rooms

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KEYWORDS: Electrocauterization, volatile organic chemicals, irritants, OR

RESEARCH SUMMARY:

A series of health hazard evaluations is being conducted in response to concerns about exposure to surgical smoke among OR personnel. Several site visits have been conducted and others are being planned. These visits include industrial hygiene sampling to evaluate chemical exposures, assessment of ventilation and other engineering controls, and assessment of potential health effects among employees (using a questionnaire).

Gas and Vapor Monitoring

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KEYWORDS: Airborne contaminants, exposure assessment, industrial hygiene

RESEARCH SUMMARY:

This project aims to develop and evaluate a portable sensor serving as an out-of-compliance monitor of nitrous oxide in dental offices. The sensor developed in this project will allow dental personnel to make real-time measurements of nitrous oxide in the ambient air inside the dental office. This will allow them to make immediate corrections to situations where overexposure to nitrous oxide is occurring. Due to its significant effects in the medical, industrial, agricultural, and environmental areas, the results of this project can also be valuable to industrial hygienists or safety and health personnel to improve safety and health of workers in other occupations. The technology developed will also be applicable to other gas or vapor types. Commercialization of the sensor design and technological approaches is likely.

Health and Safety: Pollution Prevention in Hospitals

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KEYWORDS: Health care workers, intervention, industrial hygiene

RESEARCH SUMMARY (Excerpted from Principal Investigator's description):

In response to new regulatory and community-based initiatives, many hospitals in the United States will develop plans to change their waste management and materials use practices within the next two years. This rapid introduction of new materials and work practices will have significant implications for the occupational health and safety of hospital workers, particularly if these workplace changes intended to improve the ambient environment are not brought about using sound work environment practices. This project will use the opportunity provided by the environmental incentives for hospitals to develop active pollution prevention plans to work with three hospitals to develop specific, integrated methods for implementing occupational health and safety-pollution prevention intervention strategies. The objective of the proposed work is to develop workplace intervention strategies to reduce the use of polyvinyl chloride (PVC)- and mercury-containing materials in hospitals, while improving the occupational health and safety of hospital workers.

Immunotoxicity of Workplace Xenobiotics

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KEYWORDS: Immunotoxicology, method development, latex

RESEARCH SUMMARY:

The overall goal of this project is to establish an improved database for workers who are exposed to xenobiotics that cause immune injury or immune-mediated disease, and to relate the measured indicators of immune changes to those seen in animal models. Results from animal studies serve as a developing database for predicting no-effect levels and potential health risks for workers. The main activity of this project is the performance of field and animal studies related to latex allergy. This is an Interagency Agreement that is designed to enable NIOSH and NIEHS to conduct collaborative research studies that will potentially demonstrate the predictive value of animal immunotoxicity for worker populations.

Workplace Hazards: *Physical*

Ergonomics

Home Health Care: Identifying and Reducing Work Hazards

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KEYWORDS: Health care workers, research, ergonomics

RESEARCH SUMMARY:

Hazards associated with home health care work will be quantified in terms of frequency of occurrence and the severity of resultant illnesses and injuries. Interventions to reduce these hazards will be evaluated, focusing on reducing musculoskeletal strain during patient lifting. Existing interventions such as gait belts and transfer boards will be evaluated, and a new intervention comprising a mechanical patient lift customized for home health care workers will be developed and evaluated. Data will be obtained from thousands of home health care workers across the United States. Data sources will include (1) worker compensation records; (2) workers' reports of hazards, injuries, and illnesses; and (3) worksite job analyses and safety assessments conducted by safety and health experts. Results will provide information regarding the usefulness of existing and new interventions, and will suggest directions for future research. This project includes a study conducted intramurally by NIOSH researchers and contractors, and a study conducted extramurally through a cooperative agreement with the University of Utah.

Musculoskeletal Disorders in Nurses: Organization and Physical Work Factors

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KEYWORDS: Musculoskeletal disorders, work organization, health care workers

RESEARCH SUMMARY (Excerpted from Principal Investigator's description):

This study aims to examine neck, shoulder, and back pain/disorders in registered nurses (RNs) working in a variety of health care settings, using an anonymous mailed survey of 2,000 nurses in two states. Specifically, this study will examine the relationship between musculoskeletal pain/disorders and physical work factors, and the modifying (or potentiating) effects of organization of work factors on this relationship. In addition, this study will document the prevalence of a number of specific preventive initiatives and control strategies associated with a reduction in work-related musculoskeletal disorders (MSDs) in this industry.

Ionizing/Nonionizing Radiation

NIOSH Exposure Assessment for Radiologic Technologists

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KEYWORDS: Radiologic Technologists, radiation, exposure assessment

RESEARCH SUMMARY:

This study will determine exposures to ionizing radiation in a group of radiologic technologists employed at medical facilities in the United States in order to determine if exposure to fractionated and protracted doses of ionizing radiation is associated with cancer incidence or mortality. To accomplish this, a model will be developed that estimates exposure as a function of a number of predictor variables obtained from a set of detailed work history questionnaires. Scientists at the National Cancer Institute (NCI) will use the results of the exposure assessment to examine the relationships between exposure to fractionated and protracted doses of ionizing radiation and the risk of cancer morbidity or mortality. The results may be used to determine if the radiation exposure limits established by the Nuclear Regulatory Commission and Department of Energy are set at levels that adequately protect workers' health.

Reproductive Outcomes in Radiologic Technologists

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KEYWORDS: Reproductive hazards, radiation, epidemiology

RESEARCH SUMMARY:

The purpose of this study is to examine the reproductive health effects of moderate to low doses of ionizing radiation among radiologic technologists in collaboration with the Radiation Epidemiology Branch of NCI and the University of Minnesota. Although reproductive toxicity from exposure to ionizing radiation has been a subject of concern for many years, current risk estimates for reproductive health outcomes may be poorly characterized for radiation workers. In 1982, NCI and the University of Minnesota initiated a study of cancer incidence/mortality and reproductive health among approximately 146,000 certified, predominantly female (73%), radiologic technologists in the United States. NIOSH expertise in previous reproductive studies of this nature, and in generating accurate work history-based exposure estimates, provides a singular opportunity to fully address the issue of occupational reproductive hazards to female radiologic technologists from ionizing radiation.

Violence

Effects of OSHA Guidelines on Violence Prevention in Mental Health

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KEYWORDS: Assault, health care workers, work organization

RESEARCH SUMMARY (Excerpted from Principal Investigator's description):

This project will evaluate the effectiveness of the OSHA guidelines in three New York State mental health facilities. The study has the following specific aims: 1) to document and describe a process for implementing OSHA violence prevention guidelines within three types of mental health facilities—one adult psychiatric, one child psychiatric, and one forensic facility; 2) to compare assault rates, risk factors for assault, and job satisfaction in these three types of facilities one year prior to and one year following implementation of a comprehensive OSHA guideline-based violence prevention program; and 3) to assess the cost and benefit of implementing OSHA violence prevention guidelines within a state mental health facility.

Prevention of Violence Against Nurses: Feasibility Study

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KEYWORDS: Violence, health care workers, feasibility assessment

RESEARCH SUMMARY:

This project is a feasibility study for a case-control study to evaluate OSHA guidelines for prevention of violence against nurses, nursing aides, and orderlies. In order for the full-scale, case-control study to be able to effectively evaluate the OSHA guidelines, it will include a large number of health care workers from a representative sample of hospitals and nursing homes. The proposed feasibility study will address many of the practical issues that must be worked out in order for the full-scale study to succeed. In particular, the feasibility study will provide the opportunity to: 1) develop and test the study protocol and data collection instruments; 2) demonstrate the ability to recruit hospitals and nursing homes into the study and collect institutional data including safety assessments, safety policies and procedures, OSHA 200 logs, and employment statistics; 3) establish a mechanism for identifying cases of violence against health care workers and work-related assault injuries, select controls, and collect appropriate data from both cases and controls; and 4) establish a working relationship with local health departments which could provide a prototype for successful completion of a larger case-control study with sufficient power to evaluate OSHA guidelines.

Study of Risk Factors for Violence among Nurses

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KEYWORDS: Violence, injuries, health care workers

RESEARCH SUMMARY (Excerpted from Principal Investigator's description):

This study is designed to identify the magnitude of the problem of work-related violence within a major occupational population and to identify specific risk factors using a case-control design. The primary aims are to determine the relation between work-related violence in a cohort of registered and licensed practical nurses and: 1) personal exposures (including patient contact hours, workload, shifts worked, illness/injury history, including prior work- and non-work-related assault injuries, demographics, and use of alcohol, tobacco, and other drugs); and 2) environmental situations/exposures in the workplace, such as types of hospitals/departments/specialty wards, staffing patterns, management protocols, physical environments (lighting, barriers, room configurations), general social environments (support/tolerance for harassment and abuse), and types of patients (relevant diagnoses/hospitalization duration). From this effort, specific prevention and control strategies can be developed more realistically.

Work-Related Violence against Women

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KEYWORDS: Violence, intervention, health care workers

RESEARCH SUMMARY:

This project utilizes the National Crime Victimization Survey (NCVS) to incorporate a special topic supplement on workplace victimization. The NCVS is a household-based survey of over 100,000 individuals conducted annually by the Bureau of the Census, for the Bureau of Justice Statistics (BJS). Within the data that are routinely collected, "at work" victimizations can be identified and analyzed separately from the larger universe of all victimizations. However, the survey does not include a number of workplace-specific issues that would allow for detailed description and assessment of workplace incidents and work-related risk factors, including the actual relationship of the victim to the offender, the presence/use of workplace violence prevention strategies, or the actions of the victim and their impact on the outcome or severity of the attack. The specific content of this supplement will be developed jointly by NIOSH, the Department of Health and Human Services (DHHS) Office of Women's Health, the National Center for Injury Prevention and Control, BJS, the National Institute of Justice, the Office for Victims of Crime, the National Center for Victims of Crime, and other interested agencies or groups.

Workplace Hazards: Psychosocial

Effects of Extended Work Hours on Intern Health and Safety

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KEYWORDS: Work organization

RESEARCH SUMMARY (Excerpted from Principal Investigator's description):

This research study will test the hypotheses that: 1) extended workdays/long workweeks of health care interns are associated with increased risk of actual and near-miss motor vehicle crashes, falling asleep at the wheel, falling asleep while working, and a reduction in quality of life measures; 2) provision of ten hours of protected time for sleep will substantially increase sleep obtained during intensive care unit, on-call nights; and 3) physicians provided with ten hours of protected time for sleep while on-call will exhibit improved performance, enhanced alertness, and fewer microsleep episodes while on duty. A prospective questionnaire study of all U.S. physicians and dentists in their first post-graduate year will compare the occurrence of adverse events in physicians who are required to work extended workdays (greater than 30 consecutive hours) and long workweeks (greater than 80 hours per week) versus dentists who are not required to work such extended workdays or long workweeks in their first postgraduate year. A second intervention study will evaluate the efficacy of providing ten hours of protected time for sleep on improving alertness and performance and reducing the safety hazards associated with 36-hour on-call shifts. The results of the study could have important public policy implications for graduate medical education and training, and for the health and safety of medical and surgical residents.

Extended Work Schedules and Workplace Injury in Nurses

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KEYWORDS: Health care workers, work organization

RESEARCH SUMMARY (Excerpted from Principal Investigator's description):

Nurses face many occupational hazards; among the most common are musculoskeletal disorders and the transmission of BBP such as HIV and hepatitis C through needlestick injuries. Extended work schedules increase the length of workplace exposure to hazards that lead to such injuries. To address the problem of extended work and its health impact on nurses, this project will: 1) examine the nature and prevalence of extended work schedules (hours/day, hours/week, mandatory and voluntary overtime, breaks) among nurses in a variety of settings; 2) determine the relationship of extended work schedules to musculoskeletal pain/disorders, (measured longitudinally); and 3) determine the relationship between extended work schedules and needlestick injuries, (measured longitudinally). Survey data will be collected from a probability sample of 3500 actively-licensed RNs in two States. The goal of this study is to provide a comprehensive examination of the impact of such work arrangements on the health of nurses.

Health and Safety Outcomes Related to Work Schedules in Nurses

CONTACT: Claire Caruso
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Division of Applied Research and Technology
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KEYWORDS: Health care workers, work organization, hazard identification

RESEARCH SUMMARY:

This study will use an exploratory, cross-sectional design to survey RNs and examine how their hospital work schedules may contribute to the high risk for occupational safety and health problems that is seen in this profession. The purpose of this study is to examine associations between shift work and overtime schedules and self-reported health and safety outcomes in RNs employed on inpatient acute care hospital units. Targeted outcomes will include gastrointestinal symptoms, cardiovascular symptoms, mood changes, sleep problems, automobile crashes and near misses, injury at work, musculoskeletal disorders, and needlestick injuries. Since the mean age of the RN workforce is increasing, this study will also examine the question of age as a contributing factor to increased health and safety outcomes.

Health Disparities among Health Workers

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KEYWORDS: Health care workers, socioeconomic, injuries

RESEARCH SUMMARY (Excerpted from Principal Investigator's description):

Socioeconomic position (class, gender, and ethnicity) is inversely associated with risk of morbidity and mortality due to various conditions. This project will examine the work environment as a primary mediator of the effect of socioeconomic position on population health. Multiple data sources will be used to evaluate job features such as physical load (e.g., heavy lifting), shift work, the threat of interpersonal violence, and high psychological job demands coupled with low decision autonomy. Facility-wide characteristics such as adequacy of staffing, management commitment to occupational health and safety programs, and policies concerning gender and racial discrimination and sexual harassment will also be considered as factors. Morbidity will be assessed by survey instrument, as well as from facility records of absenteeism, work-related injury and illness, and compensation claims. The study will be conducted within the health care industry, which employs a large portion of the working population in Massachusetts (and the Nation) and is an increasingly important employer of minority workers.

Work Hours, Musculoskeletal Disorders, and Cardiovascular Disease Risk

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KEYWORDS: Work organization, cardiovascular disease

RESEARCH SUMMARY (Excerpted from Principal Investigator's description):

Stressful features of work organization, including long work hours, have recently been identified as risk factors for blood pressure elevation and cardiovascular disease, and have been suggested as risk factors for work-related MSDs. The proposed study has two primary, specific aims: 1) to determine associations between extended work hours, ergonomic risk factors, other psychosocial job stressors, and work-related MSDs; and 2) to determine associations between extended work hours, other psychosocial job stressors (including job strain, effort-reward imbalance, and shift work), blood pressure elevation, and cardiovascular disease risk. The study population will include white-collar and blue-collar men and women from the health care, transportation, and manufacturing industries, many of whom currently work overtime extensively. The study is also designed to examine the effect of characteristics of overtime, to assess how overtime may interact with other stressful features of work organization, physical stressors, or demographic measures, and to investigate the impact of recent changes in the organization of work on work hours, psychosocial job stressors, ergonomic risk factors, and work climate.

Work Organization and Depression among Nursing Home Aides

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KEYWORDS: Work organization, stress, health care workers

RESEARCH SUMMARY (Excerpted from Principal Investigator's description):

The proposed study will assess the relationship between working conditions and the prevalence and incidence of major depression among nurse aides within 50 nursing homes in Kentucky, Ohio, and West Virginia. The overarching hypothesis of this three-year study is that work organization (i.e., the amount of work to be performed and the capacity to decide how to do it) will have a direct effect on the prevalence and incidence of major depression among nurse aides. The results of this study will have implications for workplace policies that have the potential to reduce depression and associated loss of productivity among workers in nursing homes across the United States.

Work Organization and Health among Home Care Workers

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KEYWORDS: Stress

RESEARCH SUMMARY (Excerpted from Principal Investigator's description):

A cross-sectional study of home care workers employed under different types of work arrangements in Los Angeles County, California will be used to assess the relationship between the organization of work and the prevalence of major depression and MSDs among home care workers. The overarching hypothesis of this three-year study is that work organization (i.e., the amount of work to be performed and the capacity to decide how to do it) will have a direct association with prevalence of major depression and MSDs among home care workers. In home care agencies across the United States, these study results are expected to have implications for workplace policies that have the potential to reduce depression and MSDs, as well as the associated loss of productivity from these disorders.

Work Schedules and Health in Women Health Professionals

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KEYWORDS: Work organization, women's health, stress

RESEARCH SUMMARY (Excerpted from Principal Investigator's description):

Female health care providers with children at home experience especially heavy stress and are at high risk for psychological distress and stress-related physical health problems. The aim of the proposed three-year, in-depth interview and survey study is to estimate the relationship between full- and part-time work schedules and stress-related, mental and physical health outcomes in a random sample of 200 married women, ages 25–50, who have under-high school-age children, vary in race/ethnicity, and are employed in two health care professions that vary in occupational prestige—medicine and licensed practical nursing.

Workplace Hazards: *Other Hazards*

Evaluation of Emergency Service Vehicle Occupant Safety

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KEYWORDS: Fatalities, emergency responders, firefighters

RESEARCH SUMMARY:

Over an expected project period of two years, NIOSH will collaborate with the National Highway Traffic Safety Administration in producing an analysis of available data to identify ambulance crash cases, and in conducting in-depth field investigations of selected cases using the Fatality Assessment and Control Evaluation model. Followback investigations of cases in the Fatal Accident Reporting System may also be conducted, depending on findings from currently available data. Investigations will focus on determining the occupants' locations within the patient compartment at the time of the crash, their use of available restraint systems, the mechanism of injury, and vehicle operation procedures. The project will build on ambulance crash test data collected by Johns Hopkins University and the Navel Air Warfare Center, Aircraft Division. Using video footage collected during the crash tests by Johns Hopkins project staff, the patient compartment will be evaluated to identify sources of injury during a collision, including injuries from secondary occupational fatalities.

Hazard Emergency Response Personnel

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Education and Information Division
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KEYWORDS: Emergency responders, firefighters, catastrophic failure

RESEARCH SUMMARY:

Emergency response workers face known and unknown hazards from environments that may change rapidly as a result of conditions encountered in emergency response situations. This project will evaluate the key information about the safety and health risks of emergency response workers during response to all kinds of emergency activities. The specific activities of this project are to: 1) conduct extensive literature searches; 2) conduct focus groups and personal interviews to determine the response to products stemming from this research; 3) participate in state, federal, and international activities to establish capacities, arrive at recommendations (Acute Exposure Guidelines National Advisory Committee and CDC counter-terrorism committees), and evaluate products; and 4) determine from the array of information, the most effective resources and products (and their distribution) needed by emergency response workers to perform their duties.

Hazards of Health Care Workers in Home Health Care Settings

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KEYWORDS: Violence, health care workers, injuries

RESEARCH SUMMARY:

The purpose of this project is to develop a document for the home health care industry, its safety and health professionals, and its workers. The document will include chapters on hazards such as violence, stress, latex allergy, needlestick issues, and ergonomic issues. Documents currently available on these issues generally approach the topics from the hospital workers' perspective. Although these hazards exist in multiple health care settings, the specifics of these hazards (and recommendations for their prevention and control in home health care settings) may differ from other health care settings. This document will assist employers and workers in developing programs appropriate to the home health care setting, for the prevention of occupational injuries and illnesses.

Health Hazard Evaluations and Technical Assistance Respiratory Disease Health Hazard Evaluations

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KEYWORDS: Hazards, identification, exposure assessment, risk assessment, respiratory disease, asthma

RESEARCH SUMMARY:

NIOSH conducts investigations of possible health hazards in the workplace. These investigations, called health hazard evaluations (HHEs), are conducted under the authority of the Occupational Safety and Health Act of 1970, which authorizes the Secretary of DHHS, following a written request from employees, authorized representatives of employees, or employers, to determine whether any substance normally found in the place of employment has potentially toxic effects in such concentrations as used or found. Recent evaluations in health care facilities have focused on occupational exposures to TB, BBP, aerosolized medications, latex, laser and electrocautery emissions, mold, cleaning products, disinfectants, and physical stressors. Findings and recommendations from HHEs are available on the NIOSH website.

Risks for Adverse Reproductive Outcomes among Nurses

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KEYWORDS: Reproductive hazards, health care workers, epidemiology

RESEARCH SUMMARY:

Over 2.5 million RNs are employed in the United States, 95% of whom are female. Female nurses may be at increased risk of adverse reproductive outcomes through exposure to a wide variety of potential reproductive hazards including chemical and biological agents, physical demands, shift work, and psychological stress. The reproductive toxicity of certain chemical exposures (e.g., antineoplastic drugs) has been relatively well documented. Other exposures, such as shift work and physical demands, have not been as thoroughly investigated, particularly in U.S. health care workers. Taken together, the studies that have been done suggest a link between these exposures and adverse pregnancy outcomes, but further study is needed. This project seeks to better understand the impact of shift work and physical demands on reproductive health by collecting data from a subset of the Harvard University Nurses' Health Study cohort.

Workplace Intervention and Prevention Strategies

Evaluation of Best Practices Back Injury Prevention Program

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KEYWORDS: Health care workers, ergonomics, effectiveness research

RESEARCH SUMMARY:

The goal of this project is to evaluate the implementation and impact of a best practices program for back injury prevention in five nursing homes. The best practices program consists of mechanical lifting equipment, a zero-lift policy, and a medical management program that encourages quality health care, rehabilitation, and light duty work for injured workers while they are reintegrated into the workforce. This study will evaluate the process and methods of program implementation and, most importantly, the impact of the program for reducing the incidence and severity of back injuries and the costs associated with these injuries among nursing staff in nursing homes.

Getting to Zero in Nursing Homes: Intervention Effectiveness

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KEYWORDS: Musculoskeletal disorders, injury prevention, effectiveness research

RESEARCH SUMMARY (Excerpted from Principal Investigator's description):

This intervention effectiveness study has two main goals. The first is to evaluate the successful implementation of zero-lift-type programs in nursing homes in Washington State after distribution of zero-lift program training materials by the Washington Health Care Association to 75% of Washington State nursing homes. In addition, two workers' compensation incentive pilot programs for the implementation of zero-lift programs in a small subset of nursing homes will be evaluated. The second goal is to evaluate the effectiveness of these programs in reducing the incidence and severity of low back and shoulder injuries in nursing assistants.

Innovative Health Care Worker Training: Infectious Disease Risk

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KEYWORDS: Infectious disease, intervention

RESEARCH SUMMARY (Excerpted from Principal Investigator's description):

The purpose of this pre-post intervention assessment study is to develop, implement, and evaluate novel, computerized simulation training programs for the reduction of infectious disease risk in RNs. Simulation exercises will be developed using a participatory action research format. The exercises, targeting BBP and TB, will be formatted into an interactive, Web-based program and administered to 5000 volunteer RNs. Exercises and questionnaires will be completed on-line at the study's Website. Baseline measures of employee knowledge, perceptions, attitudes, behavioral intentions, current safety practices, and recent past history of exposures will be collected from participants and followed by 3-month and 6-month, follow-up questionnaires.

Intervention to Mitigate Adverse Effects of Shift Work

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KEYWORDS: Intervention, effectiveness research, health care workers

RESEARCH SUMMARY (Excerpted from Principal Investigator's description):

Sleep deprivation, common in night workers, is a major cause of accidents and fatalities. Melatonin is effective in accelerating adjustment to alterations in the 24-hour light/dark cycle in certain conditions (e.g., jet lag and blindness). The proposed project will test the hypothesis that melatonin accelerates the adjustment of workers to a reversal in the activity/sleep cycle from daytime to night work by synchronizing sleep to the desired schedule, and consequently, improving alertness and mood during the waking hours. The hypothesis will be tested in an actual workplace, a hospital. Subjects will be physicians-in-training, whose work requires intense alertness and vigilance. The proposed model of shift work and the outcome measures are not job-specific; therefore, the results of the study can be generalized to other occupations which require high levels of vigilance and alertness. The expected benefits of the proposed intervention may lead to development of new strategies for adjustment to night work, resulting in increased safety and a reduction in accidents and fatalities related to sleep deprivation in night workers.

Reducing Violence against Nursing Home Caregivers

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KEYWORDS: Intervention effectiveness

RESEARCH SUMMARY (Excerpted from Principal Investigator's description):

The purpose of this study is to test the effectiveness of an intervention to decrease violence against Certified Nursing Assistants (CNAs). The aims of the study are to: 1) describe the context in which assaults occur; 2) increase CNAs' skills to prevent assaults; and 3) decrease the incidence of assaults against CNAs.

The Role of Social Networks in Workplace Injuries

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KEYWORDS: Work organization, injuries, health care workers

RESEARCH SUMMARY (Excerpted from Principal Investigator's description):

This study will examine how the social context surrounding workers modifies their risk of injury by shaping access to the potentially risk-reducing resources possessed by co-workers. In particular, information, physical assistance, and social support are hypothesized to be resources that can help workers avoid injury hazards. Social network measurements (sociometrics) are used to quantify properties of work groups and of the way individuals relate to group members, rather than properties of individuals. The study population will consist of nurses and nurse aides employed in a long-term psychiatric facility studied prospectively over one year. Results are expected to provide a better understanding of social factors in the injury process.

Slips and Falls Prevention in Health Care Workers

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Division of Safety Research
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KEYWORDS: Health care workers, falls, intervention

RESEARCH SUMMARY:

The objective of this project is to develop, implement, and evaluate a slips, trips, and falls prevention program in three hospitals. Slip-resistant shoes, mats, and waxes, prompt cleaning of spillage and debris, clear stairs and walkways, improved lighting, addition of hand-holds, and the clearing of ice and snow have the potential to reduce slips, trips, and falls incidents. A case-crossover method will be used to interview injured workers and identify specific risk factors for slips, trips, and falls incidents. A laboratory study will examine the slip-resistance characteristics of shoes, samples of hospital flooring, and floor treatments. Slip-resistant shoes, aggressive housekeeping, and other counter measures identified in the lab will be introduced into the hospitals to reduce slips, trips, and falls incidents. The intervention will be assessed for a 36-month pre-intervention, and a 36-month post-intervention, for its impact on the frequency, severity, and cost of slips, trips, and falls incidents.

Tailoring NIOSH Messages to Individual Health Construals

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KEYWORDS: Communication research, health care workers, computer

RESEARCH SUMMARY:

This research project examines the impact of message tailoring to individual construals via the Web. First, this project will assess the evaluative processes underlying stress reduction behavior for nurses who construe the issue of occupational stress reduction in terms of “maintaining one’s health” versus those who construe it as “illness prevention.” In a second study, participants will be randomly assigned to a Web communication (based on the NIOSH document, *Stress...at Work*) that uses gain and loss-framed arguments designed to match or mismatch their construal of this issue. It is expected that message tailoring on this variable (matching message to construal) will result in enhanced attitude and behavioral compliance with recommendations provided in the NIOSH communication.

Workplace Surveillance

National Exposures-at-Work Survey

CONTACT: James Boiano
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KEYWORDS: Feasibility assessment, hospital, hazard surveillance

RESEARCH SUMMARY:

The National Exposures-at-Work Survey (NEWS) will be conducted in workplaces across different industrial sectors over the next several years, starting with the health services sector. The purpose of this survey is to collect data about exposures to occupational hazards, the use of exposure controls, and management and worker health and safety practices. Initially, feasibility assessments (i.e., pilot studies) will be conducted in a limited number of hospitals for the purpose of evaluating and refining methods, instruments, and data collection tools. The pilot studies are expected to provide comprehensive, field-tested methodologies and data collection instruments for hazard surveillance in other health care workplaces and, with sector-specific modifications, to serve as a basis for hazard surveillance in other industry sectors. Data from each industry sector surveyed will be used to identify areas for further scientific research and intervention. Completion of the pilot studies is expected in 2002. The NEWS in the health services industry is expected to start in 2003.

State-Based Surveillance Activities

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KEYWORDS: Surveillance, asthma, silicosis

RESEARCH SUMMARY:

This project provides technical support and nationwide coordination for state-based surveillance and intervention of occupational respiratory diseases. Current activities are primarily focused on states involved with asthma and/or silicosis activities. NIOSH assists states with the development of simple, effective surveillance models and interventions and collaborates with those states to summarize and disseminate relevant data from the programs. Expected outcomes include refined surveillance case definitions, ascertainment methods, and intervention. Summary reports of aggregated surveillance and intervention data will be disseminated through a variety of mechanisms. Data collected and reviewed as part of this study, and other national data, documented the increase in asthma among health care workers. As a result, the participating states now have a plan for focused surveillance of asthma cases among nurses.

Surveillance Methods for Health Care and Related Workers

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KEYWORDS: Surveillance

RESEARCH SUMMARY (Excerpted from Principal Investigator's description):

The major objective of this research is to develop a comprehensive system for health, injury, and hazard surveillance of health care workers. This will be accomplished through the combination of population-based and case-based data. A job-exposure matrix will be developed for hazard surveillance and for estimation of individual exposures through linkage with each worker's job history. The surveillance system will use analytical tools for cohort data to study the incidence and causes of work-related injuries and health conditions, the identification of high-risk populations, and appropriate prevention measures. Specific conditions to be addressed by case-based surveillance will include patient lifting and handling injuries, other noninfectious occupational injuries, latex allergy, occupational asthma, and work-related stress. The system will be implemented for five years of surveillance of a cohort of over 10,000 health care workers employed by Duke University Health Systems. While the utility of the system will be evaluated in this setting, the goal of the project is to define elements and performance characteristics of a model surveillance system that could be used in other health care institutions.

A Validated Asthma Questionnaire for Health Care Workers

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KEYWORDS: Health care workers

RESEARCH SUMMARY (Excerpted from Principal Investigator's description):

The purpose of this project is to develop, validate, and field test a new survey instrument for work-related asthma among health care workers that will permit the assessment of occupational and non-occupational exposures that may result in the development of work-related asthma. This 3-year study will be conducted in two phases. The specific aim of phase 1 is to develop and validate a new survey instrument for work-related asthma for use in health care settings. The questionnaire will be validated by administering it to a convenience sample of 100 health care workers (both with and without asthma), and comparing results to “gold standards” for asthma (methacholine bronchial challenge test) and non-occupational exposures risk factors (RAST IgE-specific antibody panel against common environmental aeroallergens and latex). Occupational exposures will be determined by two separate methods: 1) a job-exposure matrix previously developed by NIOSH for use in health care settings and modified to focus specifically on asthmagens; and 2) self-reported exposures, compared to and supplemented by expert industrial hygienist review. The a priori developed job exposure matrix will be validated and updated through a series of workplace visits to area hospitals. The specific aims of phase 2 are to: 1) cross-validate and field test the new survey instrument in a population-based sample of four groups (n=1,400 per group) of health care workers (nurses, physicians, respiratory therapists, and occupational therapists), identified through their respective licensing boards in Texas; 2) estimate and compare the prevalence of work-related asthma among these four occupational groups; 3) analyze associations between occupational and non-occupational exposures among health care workers with and without asthma in this population; and 4) estimate the occupational burden in these four occupational groups.

Work-Related Lung Disease Surveillance Report

CONTACT: Robert M. Castellan
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KEYWORDS: Surveillance, respiratory disease, mortality

RESEARCH SUMMARY:

This Work-Related Lung Disease (WoRLD) Surveillance Report disseminates updated occupational respiratory disease data for the United States. These serial reports contain condition-specific, population-based, and case-based data, including death counts, crude and age-adjusted mortality rates, years of potential life lost, geographic distributions, proportionate mortality ratios by industry and occupation, morbidity data, and other data for various pneumoconioses and several other lung diseases that are often attributable to work exposures. Relevant exposure data from OSHA and the Mine Safety and Health Administration compliance inspections are also presented. This report is an excellent resource for public health officials and others who are involved in identifying and investigating diseases that may occur from occupational exposures in the healthcare industry, as well as in other occupational settings.

Projects Focusing on a Specific Worker Population

Correctional Health Care Workers

A Program to Estimate the Risk of Occupational Infectious Diseases in
State Correctional Facilities
Respirator Efficacy *versus* Tuberculosis Aerosols

Dental Professionals

Gas and Vapor Monitoring

Emergency Response Workers

Evaluation of Emergency Service Vehicle Occupant Safety
Hazard Emergency Response Personnel

Home Health Care Workers

Home Health Care: Identifying and Reducing Work Hazards
Work Organization and Health among Home Care Workers

Night Workers

Intervention to Mitigate Adverse Effects of Shift Work

Nurses

Evaluation of Best Practices Back Injury Prevention Program
Extended Work Schedules and Workplace Injury in Nurses
Health and Safety Outcomes Related to Work Schedules in Nurses
Innovative Health Care Worker Training: Infectious Disease Risk
Musculoskeletal Disorders in Nurses: Organization and Physical Work Force
Prevention of Violence against Nurses: Feasibility Study
Risks for Adverse Reproductive Outcomes among Nurses
Role of Social Networks in Workplace Injuries
State-based Surveillance Activities
Study of Risk Factors for Violence among Nurses
Tailoring NIOSH Messages to Individual Health Construals
Work Schedules and Health in Women Health Professionals

Nursing Assistants

Getting to Zero in Nursing Homes: Intervention Effectiveness
Prevention of Violence against Nurses: Feasibility Study
Reducing Violence against Nursing Home Caregivers
Role of Social Networks in Workplace Injuries
Work Organization and Depression among Nursing Home Aides

Operating Room Personnel

Assessing Latex Avoidance on Occupational Sensitization
Evaluation of Traumatic Injuries in Health Care Workers During Surgery
Exposure to Surgical Smoke in Operating Rooms

Orderlies

Prevention of Violence against Nurses: Feasibility Study

Physicians

Effects of Extended Work Hours on Intern Health and Safety
Intervention to Mitigate Adverse Effects of Shift Work
Trends in Latex Antibody Prevalence among Health Professionals
Work Schedules and Health in Women Health Professionals

Radiologic Technicians

NIOSH Exposure Assessment for Radiologic Technologists
Reproductive Outcomes in Radiologic Technologists

Women

Risks for Adverse Reproductive Outcomes among Nurses
Work Schedules and Health in Women Professionals
Work-Related Violence against Women
Work Schedules and Health in Women Health Professionals

Projects Focusing on a Particular Type of Workplace

Correctional Facilities

A Program to Estimate the Risk of Occupational Infectious Diseases
in State Correctional Facilities

Dental Offices

Gas and Vapor Monitoring

Home Health Care

Home Health Care: Identifying and Reducing Work Hazards
Hazards of Health Care Workers in Home Health Care Settings
Work Organization and Health among Home Care Workers

Hospitals

Assessing Latex Avoidance on Occupational Sensitization
Evaluating Exposures under OSHA's EtO Standard
Evaluation of Traumatic Injuries in Health Care Workers During Surgery
Exposure to Surgical Smoke in Operating Rooms
Hazard Review: Hazards in Hospitals and Health Care
Health and Safety – Pollution Prevention in Hospitals
Health and Safety Outcomes Related to Work Schedules in Nurses
Intervention to Mitigate Adverse Effects of Shift Work
National Exposures-at-Work Survey (NEWS)
Prevention of Violence Against Nurses: Feasibility Study
Slips and Falls Prevention in Health Care Workers

Mental Health Facilities

Effects of OSHA Guidelines on Violence Prevention in Mental Health
Role of Social Networks in Workplace Injuries

Nursing Homes

Evaluation of Best Practices Back Injury Prevention Program
Getting to Zero in Nursing Homes: Intervention Effectiveness
Prevention of Violence against Nurses: Feasibility Study
Reducing Violence against Nursing Home Caregivers
Work Organization and Depression among Nursing Home Aides

Veterans Health Administration Hospitals

Health and Safety Outcomes Related to Work Schedules in Nurses
Natural Rubber Latex in Veterans Administration Health Care Workers