Current NIOSH Research in the Healthcare and Social Assistance Industry Sector

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Healthcare and Social Assistance Sector Coordinator

Association of Occupational Health Professionals in Healthcare
2019 Annual Conference

September 7, 2019
Public Health

- Department of Health and Human Services (DHHS)
- Centers for Disease Control and Prevention (CDC)
- National Institute for Occupational Safety and Health (NIOSH)

Regulatory

- Department of Labor (DOL)
- Occupational Safety and Health Administration (OSHA)
NIOSH

To develop new knowledge in the field of occupational safety and health and to transfer that knowledge into practice.

OSHA

Assure safe and healthful working conditions for working men and women by setting and enforcing standards and by providing training, outreach, education and assistance.

Sources: “About OSHA”, U.S. Department of Labor, OSHA, Available at: https://www.osha.gov/about.html
“About NIOSH”, NIOSH, CDC, U.S. Department of Health and Human Services, Available at: https://www.cdc.gov/niosh/about/default.html
NIOSH Locations
NIOSH Divisions

- Division of Compensation Analysis and Support (DCAS)
- Division of Safety Research (DSR)
- Division of Field Studies and Engineering (DFSE)
- Division of Science Integration (DSI)
- Health Effects Laboratory Division (HELD)
- National Personal Protective Technology Laboratory (NPPTL)
- Pittsburgh Mining Research Division (PMRD)
- Spokane Mining Research Division (SMRD)
- Respiratory Health Division (RHD)
- Western States Division (WSD)
- World Trade Center Health Program (WTCHP)
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NIOSH Strategic Plan

NIOSH Strategic Plan: FYs 2019–2023

Version 3: March 2019
## NIOSH Strategic Plan

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Healthcare and Social Assistance Industry Sector

- **Ambulatory Health Care Services:** NAICS 621
  - Outpatient Care Centers: NAICS 6214
  - Medical and Diagnostic Laboratories: NAICS 6215
  - Home Health Care Services: NAICS 6216

- **Hospitals:** NAICS 622
  - General Medical and Surgical Hospitals: NAICS 6221
  - Psychiatric and Substance Abuse Hospitals: NAICS 6222

- **Nursing and Residential Care Facilities:** NAICS 623
  - Nursing Care Facilities: NAICS 6231
  - Residential Mental Health and Substance Abuse Facilities: NAICS 6232
  - Community Care Facilities for the Elderly: NAICS 6233

- **Social Assistance:** NAICS 624
  - Individual and Family Services: NAICS 6241
  - Vocational Rehabilitation Services: NAICS 6243
  - Child Day Care Services: NAICS 6244
Healthcare and Social Assistance Industry Sector (including veterinary medicine and animal care)

- **Veterinary Services: NAICS 541940**
  - Animal hospitals
  - Veterinary clinics
  - Veterinarians' offices
  - Veterinary testing laboratories

- **Pet Care (except Veterinary) Services: NAICS 812910**
  - Boarding, grooming, sitting, and training pets
Recent NIOSH Research
Use of personal protective equipment among pregnant and non-pregnant nurses who administer antineoplastic drugs


Antineoplastic Drug Administration by Pregnant and Nonpregnant Nurses: An Exploration of the Use of Protective Gloves and Gowns

Findings from this cross-sectional study indicate a need for expanded training in safe handling practices.

Nurses administer antineoplastic (chemo- therapeutic) drugs to patients to treat many types of cancers. The use of these drugs has expanded beyond oncology to several other specialties, including dermatology, rheumatology, and ophthalmology, as well as to the operating room setting. The International Agency for Research on Cancer lists about a dozen antineoplastic drugs as known human carcinogens and another 17 as probable human carcinogens. The reproductive toxicity of antineoplastic drugs has long been recognized, based on evidence from studies of patients treated with these drugs. Yet over the past 20 years, only a few studies have examined associations between occupational exposures to antineoplastic drugs and reproductive outcomes. One meta-review concluded that health care workers with long-term, low-level occupational exposure to such drugs "seem to have an increased risk of adverse reproductive outcomes." Recommendations for the safe handling of antineoplastic and other hazardous drugs have been in place since the 1980s and have been updated by numerous governments and professional organizations ever since. In 2004, for example, the National Institute for Occupational Safety and Health (NIOSH) described the adverse health effects of occupational exposure to antineoplastic and other hazardous drugs, and made recommendations for workers on how to safely handle these drugs. Many occupational safety groups have sought to increase awareness and training regarding the hazards of such exposure; improve workplace controls; including engineering controls such as biological safety cabinets and administrative controls such as work practices and policies; and encourage the provision and use of personal protective equipment (PPE) when handling these drugs.
Use of personal protective equipment among pregnant and non-pregnant nurses who administer antineoplastic drugs


Percent of pregnant and non-pregnant nurses who reported never using protective gloves and gowns while administering antineoplastic drugs

- Latex or chemotherapy gloves
- Water-resistant gown

- Pregnant nurses: 9% Latex or chemotherapy gloves, 38% Water-resistant gown
- Non-pregnant nurses: 12% Latex or chemotherapy gloves, 42% Water-resistant gown

Administration of antineoplastic drugs and fecundity in female nurses

Health and Safety Practices Survey of Healthcare Workers

Overview

In 2011, NIOSH researchers conducted a web-based survey of healthcare workers who work with hazardous chemicals. We found employers and employees alike did not always follow best practices.

Within this site, you will learn more about our survey and the chemical hazards we studied. You will also learn how well best practices were followed for handling these chemicals, and steps employers and employees can use to minimize exposure. Finally, you will also learn details about the tools, methods, and strengths and limitations of the survey.

Learn more about the study, how the study was done, and study findings and best practices.
Health and safety practices survey of healthcare workers

Steege AL, Boiano JM, Sweeney MH

1. Better understand the circumstances to which healthcare workers may be exposed to hazardous chemicals.
2. Gauge how well best practices [i.e., engineering and administrative controls and personal protective equipment (PPE)] were being used to minimize exposure.
3. Evaluate barriers to using PPE and other exposure controls.
Health and safety practices survey of healthcare workers
Steege AL, Boiano JM, Sweeney MH

Study Findings

Here you can find key findings on worker and employer practices, literature resources, questionnaires and published articles (if available) for each of the targeted chemical agents.

- Aerosolized medications
- Anesthetic gases (in medical settings)
- Antineoplastic drugs – administration
- Antineoplastic drugs – administration (predictors of adherence to safe handling practices)
- Antineoplastic drugs – administration (effects of organizational safety practices and perceived safety climate on use of exposure controls and adverse events)
- Antineoplastic drugs – compounding
- Chemical sterilants
- High level disinfectants
- Nitrous oxide (in dental settings)
- Surgical smoke

Additionally, the survey provided an opportunity to examine respiratory protection practices and safety climate perceptions for over 10,000 respondents.

- Respiratory protection
- Safety climate
Health and safety practices survey of healthcare workers

Steege AL, Boiano JM, Sweeney MH

<table>
<thead>
<tr>
<th>What we found</th>
<th>What employers/employees should do</th>
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<td>Only half (47%) of respondents reported that LEV was always used during laser surgery and even fewer (14%) reported that LEV was always used during electrosurgery. One of every three respondents said that LEV use was not part of their employer’s protocol.</td>
<td>Have employees use LEV for all procedures where surgical smoke is generated. Smoke evacuators should be used in situations where considerable plume is generated and room wall suction systems should be used for controlling small amounts of smoke when there is adequate room air ventilation.</td>
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<td>49% of laser surgery respondents and 44% of electrosurgery respondents said that they never had training that addressed the hazards of surgical smoke.</td>
<td>Train employees on the hazards of surgical smoke and methods to minimize exposure prior to working in areas where surgical smoke is generated.</td>
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<td>Approximately 30% of both laser surgery and electrosurgery respondents said that their employer did not have standard procedures addressing surgical smoke hazards and about 40% did not know if they did or not.</td>
<td>Ensure that procedures that address the hazards of surgical smoke are available.</td>
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<td>90% of laser respondents and 98% of electrosurgery respondents used laser masks or surgical masks which do not provide respiratory protection.</td>
<td>Use a properly fitted, filtering facepiece respirator (e.g., N95) rather than a surgical or laser mask, especially in situations where LEV is lacking or not functioning properly. Respiratory protection should be at least as protective as a fit-tested N95 filtering facepiece respirator when working with known disease transmissible cases (e.g., HPV) and/or during aerosol-generating procedures or with aerosol transmissible diseases (e.g., TB).</td>
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</table>
Health and Safety Practices Survey of Healthcare Workers

Overview

In 2011, NIOSH researchers conducted a web-based survey of healthcare workers who work with hazardous chemicals. We found employers and employees alike did not always follow best practices.

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Learn more about the study, how the study was done, and study findings and best practices.
Differences in safety climate perception by health care worker, work schedule, and workplace characteristics

Silver SR, Boiano JM

• Groups with the most positive mean safety perception scores:
  • Dentists
  • Workers who were salaried or paid on a fee-for-service basis
  • Workers with 1% to 50% of their time providing patient care
Differences in safety climate perception by health care worker, work schedule, and workplace characteristics

Silver SR, Boiano JM

• Groups with the most negative mean safety perception scores:
  • Employees working 12-hour shifts or variable shifts
  • Those who worked mandatory overtime
  • Evening and night shift workers
  • Contractors
Exposures to volatile organic compounds among healthcare workers: modeling the effects of cleaning tasks and product use

Su FC, Friesen MC, Stefaniak AB, Henneberger PK, LeBouf RF, Stanton ML, Liang X, Humann M, Virji MA

- Model the determinants of:
  - ethanol
  - acetone
  - 2-propanol
  - d-limonene
  - α-pinene
  - chloroform
Exposures to volatile organic compounds among healthcare workers: modeling the effects of cleaning tasks and product use

Su FC, Friesen MC, Stefaniak AB, Henneberger PK, LeBouf RF, Stanton ML, Liang X, Humann M, Virji MA

- Cleaning tasks using chlorine resulted in elevated levels of:
  - α-pinene
  - chloroform

- Instrument sterilizing resulted in elevated levels of:
  - d-limonene
  - 2-propanol
Idiopathic pulmonary fibrosis among dental personnel
Nett RJ, Cummings KJ, Cannon B, Cox-Ganser J, Nathan SD

Morbidity and Mortality Weekly Report

Dental Personnel Treated for Idiopathic Pulmonary Fibrosis at a Tertiary Care Center — Virginia, 2000–2015
Randall J. Nett, MD\textsuperscript{1}; Kristin J. Cummings, MD\textsuperscript{1}; Brenna Cannon\textsuperscript{2}; Jean Cox-Ganser, PhD\textsuperscript{1}; Steven D. Nathan, MD\textsuperscript{2}

In April 2016, a Virginia dentist who had recently received a diagnosis of idiopathic pulmonary fibrosis (IPF) and was undergoing treatment at a specialty clinic at a Virginia tertiary care center contacted CDC to report concerns that IPF had been diagnosed in multiple Virginia dentists who had sought treatment at the same specialty clinic. IPF is a chronic, progressive lung disease of unknown cause and associated with a poor prognosis (1). Although IPF has been associated with certain occupations (2), no published data exist regarding IPF in dentists. The medical records for all 894 patients treated for IPF at the Virginia tertiary care center during September 1988–2005, the estimated annual incidence of IPF varied from 6.8 to 17.4 per 100,000 population, and the estimated prevalence varied from 14.0 to 63.0 per 100,000 population (3) and increased with increasing age (2). No published data could be found regarding dental personnel and IPF.

In June 2017, the electronic medical records of all 894 patients with a diagnosis of IPF treated at the Virginia specialty clinic during September 1996–June 2017 were reviewed to identify patients having the occupation of dentist, dental hygienist, or dental technician. Available electronic medical records of patients identified as having one of these occupa-
Prevalence of hearing loss among noise-exposed workers within the health care and social assistance sector, 2003 to 2012

Masterson EA, Themann CL, Calvert GM

Prevalence of Hearing Loss Among Noise-Exposed Workers
Within the Health Care and Social Assistance Sector,
2003 to 2012

Elizabeth A. Masterson, PhD, CPHT, COHC, NIOSH; Chris L. Themann, MA, CCC-A, NIOSH; and Geoffrey M. Calvert, MD, MPH, NIOSH

OBJECTIVES: The purpose was to estimate the prevalence of hearing loss for noise-exposed U.S. workers within the Health Care and Social Assistance (HCSC) sector. Methods: A cross-sectional, telephone-administered survey was conducted with a 10% random sample of the Health Care and Social Assistance sector from the Health and Retirement Study (HRS) between 2003 and 2012. Prevalence and adjusted risk ratios for hearing loss were calculated with a reference population of non-exposed workers. Results: The overall prevalence of hearing loss was 18.6% and 23.3% for workers exposed to noise levels above 85 and 90 dBA, respectively. The prevalence of hearing loss was higher in the HCSC sector compared to the reference population (p < 0.05). Conclusions: The prevalence of hearing loss among noise-exposed workers within the HCSC sector was found to be higher than in the general population.

METHODS

Study Design and Population

The Health and Retirement Study (HRS) dataset was used to estimate the prevalence and adjusted risk of hearing loss among noise-exposed workers within the U.S. Health Care and Social Assistance sector. The HRS is a longitudinal, population-based study that follows a representative sample of the U.S. civilian non-institutionalized population aged 51 years and older. The study design includes a baseline survey and annual follow-up interviews. The dataset contains detailed information on individual and household characteristics, health status, employment, and income. The sample population for this study consisted of workers classified as noise-exposed, as defined by the National Institute for Occupational Safety and Health (NIOSH) criteria. The prevalence of hearing loss was calculated using the NIOSH criteria, which includes exposure to noise levels above 85 dBA for at least 8 hours per day or 50 hours per week. Adjusted risk ratios were estimated using multivariable logistic regression models to account for potential confounders.

Conclusions

The prevalence of hearing loss among noise-exposed workers within the Health Care and Social Assistance sector was significantly higher than in the general population. The results highlight the need for effective noise control measures and audiometric testing programs to reduce the risk of hearing loss among these workers. Further research is needed to understand the long-term effects of hearing loss on worker health and productivity.
Prevalence of hearing loss among noise-exposed workers within the health care and social assistance sector, 2003 to 2012

Masterson EA, Themann CL, Calvert GM

Prevalence (%) of hearing loss among noise-exposed workers in healthcare industries that is significantly different than the reference industry, 2003–2012

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<th>Industry</th>
<th>Prevalence (%)</th>
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<td>Medical and Diagnostic Laboratories</td>
<td>31</td>
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<tr>
<td>Offices of Other Health Practitioners</td>
<td>24</td>
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<tr>
<td>Offices of Physicians</td>
<td>18</td>
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<tr>
<td>Child Day Care Services</td>
<td>17</td>
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<td>Community Food/Housing and Emergency/Relief Services</td>
<td>14</td>
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<td>Reference Industry (Couriers and Messengers)</td>
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Recent Health Hazard Evaluations
Health Hazard Evaluations

Health Hazard Evaluation Program

What Employees Should Know
Characterizing Exposures During Laser Tattoo Removal in a Hospital Dermatology Center

- Concerns about exposures to plumes produced during tattoo removal

- Air samples found low levels of:
  - Metals
  - Volatile organic compounds
  - Bacteria
  - Particles
• Concerns about indoor environmental quality, comfort issues, and particles coming out of the vents in the Radiology Department and the MRI Suites

• Air was bypassing the filtration systems and that the outdoor air intakes were at or below ground level
Evaluation of Nitrous Oxide Exposure at a Dental Center

- Concerns about exposures to nitrous oxide during dental procedures
- Personal employee exposures to nitrous oxide ranged from 25 to 200 parts per million
- Exposure varied from patient to patient
- Occasionally exceeded the NIOSH recommended exposure limit
Current NIOSH Research
Application of exoskeletons for safe patient handling—a feasibility study

Zheng L, Wu JZ, Carey RE, Xu SX, Wirth O, McDowell T, Sinsel EW, Dong R, Galinsky TL

- Explore the feasibility of introducing exoskeleton technology into safe patient handling.

- Identify and pretest potential products/prototypes applicable for patient handling.

- Provide a foundation for future studies
A baseline of injury and psychosocial stress for applied behavior analysis workers

Foreman A, Allison P, Wirth O, Friedel J, Hartley D, Ridenour M

- Board Certified Behavior Analysts (BCBAs) and Registered Behavior Technicians (RBTs)
- Plan and implement behavior-focused treatments to reduce violent, aggressive, and destructive behaviors
- Growth in ABA workers, but little information on the prevalence or incidence of injuries
Exposures contributing to asthma and interstitial lung disease in dental personnel


- Characterize task and full-shift exposures to particles, dust, metals, silica, VOCs and gases
- Develop task and job exposure matrices
- Create hazard communication materials
- Inform interventions to mitigate exposures
Summarize the patterns and causes of mortality, focusing on non-malignant respiratory disease, among dentists who died during 1979–2017

Describe pulmonary fibroses and other ILDs among dental personnel at select IPF treatment centers in the U.S.
Intervention strategies for *candida auris*, an emerging multi-drug resistant pathogen

Green BJ, Martin SB, Lindsley WG, Lemons AR, McClelland TL

U.S. Map: Clinical cases of *Candida auris* reported by U.S. states, as of May 31, 2019

Cases are categorized by the state where the specimen was collected. Most probable cases were identified when laboratories with current cases of *C. auris* reviewed past microbiology records for *C. auris*. Isolates were not available for confirmation. Early detection of *C. auris* is essential for containing its spread in healthcare facilities.
Intervention strategies for *candida auris*, an emerging multi-drug resistant pathogen

Green BJ, Martin SB, Lindsley WG, Lemons AR, McClelland TL

- Determine the efficacy of disinfectants to inactivate *Candida auris* on porous and hard non-porous surfaces

- Evaluate UVGI as an alternative approach to inactivate *Candida auris*
Workplace Violence Prevention Programs in NJ Healthcare Facilities

Ridenour M

- Examine healthcare facility compliance with the New Jersey Violence Prevention in Health Care Facilities Act
- Evaluate the effectiveness of the regulations in this Act in reducing assault injuries to workers.
Workplace violence prevention online courses

Hartley D, Ridenour M, Miles S, Loflin M, Wertman, S

- Violence prevention training in settings that are usually removed from any type of security or police presence
- Emergency responders
- Stand-alone healthcare facilities
- Social services and home healthcare providers

Workplace Violence Prevention for Nurses

CDC Course No. WB2908 - NIOSH Pub. No. 2013-155

Please note: The course format has been revised for easier use on all devices. The content of the course remains the same.

This free, interactive course is designed to help healthcare workers better understand the scope and nature of violence in the workplace. Upon successful completion of the course, healthcare professionals can earn continuing education units.

Course modules include:
- Definition, types, and prevalence
- Workplace violence consequences
- Risk factors for type II and III violence
- Prevention strategies for organizations
- Prevention strategies for nurses
- Post event response
Survey instrument development for assessing nonfatal occupational injuries among home healthcare workers

Derk S

- Develop a questionnaire that can be used to collect data on nonfatal injuries and exposures among home healthcare workers
- Validate the survey using the Questionnaire Appraisal System (QAS)
- Pilot test the final questionnaire with home health aides
PPE monitoring in healthcare to enhance domestic preparedness

Casey M, Moore S, Oke C, D’Alessandro M, Radonovich L

- Develop a technology-based intervention to identify PPE shortages
- Automated communication and interoperability among hospital PPE ordering/inventory systems
- Selected data sharing with health departments, PPE stockpile managers and CDC
Feasibility of elastomeric respirators in healthcare settings


- Feasibility of fit testing and user training for rapid conversion to elastomeric respirators during a simulated public health emergency
- Assess methods of disinfection
- Evaluation of ease of use, comfort, acceptability in healthcare settings
Megan Casey, RN, BSN, MPH, CIC
Healthcare and Social Assistance Sector Coordinator
ydg7@cdc.gov

For more information, contact CDC
1-800-CDC-INFO (232-4636)

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.