NATIONAL OCCUPATIONAL RESEARCH AGENDA (NORA)

08/26/2013 Revision

NATIONAL SERVICES AGENDA

FOR OCCUPATIONAL SAFETY AND HEALTH RESEARCH AND PRACTICE IN THE U.S. SERVICES INDUSTRIES

INCLUDING A REVIEW OF COMPLETED RESEARCH AND INTERVENTION ACTIVITIES BY GOAL

Developed by the NORA Services Sector Council

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INTRODUCTION, RESOURCES AND NOTES

National Occupational Research Agenda: Services Sector

The NORA Services Sector comprises workers who are employed in eleven North American Industry Classification System (NAICS, 2007) industry groups 51 – 56, 61, 71, 72, 81 and 92. These groups, respectively, are: Information; Finance and Insurance; Real Estate and Rental; Professional, Scientific and Technical; Corporate Management; Administrative Support and Waste Management; Education; Arts, Entertainment and Recreation; Accommodations and Food; Other Services; and Government aka Public Administration. In 2012, the Bureau of Labor Statistics (BLS) estimated over 66 million workers in these industries. (This total includes approximately 3 million public safety workers; separate goals have been developed for them.) The largest numbers of employees are in Education (13 million), Accommodations and Food (10 million), and Professional, Scientific and Technical (10 million), Finance and Insurance (7 million), Other Services (7 Million), Administrative Support and Waste Management (6 million), and Public Administration excluding military and public safety (4 million) (BLS, 2012b).

Jobs in the sector are highly diverse. The work environments in the services industries include offices, hotel rooms, outdoor and indoor entertainment facilities, restaurant kitchens, classrooms, automotive garages, public roads, and private households. Services workers frequently travel on roadways as part of their jobs. Many youth are first employed in services jobs, especially in Food Service and in Arts, Entertainment and Recreation. Some occupations require academic degrees and many jobs are physically demanding. A variety of occupational hazards potentially affect the health of these workers.

The NORA Service Sector Council was convened on September 13, 2006, and held additional meetings in January and November 2007 to consider priority issues for the National Services Agenda. The council examined summaries of the stakeholder input that had been received during Town Hall meetings between December 2005 and December 2006 and the comments that were submitted through the NIOSH website during the same period. Occupational safety and health surveillance data for services industries were reviewed and summarized for the Council, primarily for years 2003 to 2006. These data are most reliable for occupational fatalities resulting from traumatic injuries and other occupational injuries that are required to be entered on the OSHA 300 Log. Significant gaps in data for other injuries and all occupational illnesses were identified.

The Council decided to group its goals by services industry sub sectors. Those services sub sectors were chosen by the council after deliberations at the September 2006 and January 2007 meetings. At the January and November 2007 meetings, small groups discussed the current knowledge related to exposures, illnesses, injuries and fatalities in the sub sectors. Gaps in knowledge and intervention opportunities were identified and sets of related goals were drafted. The small group goals were consolidated and the versions of the draft goals were refined. The draft goals were made available for public comment on February 29, 2008. Two comments emphasized the importance of reproductive health and the goals were modified to include these issues.

Since that time, the Services Sector Council has continued to monitor injury, illness and fatality surveillance information from BLS and has been kept informed on research and intervention projects related to the goals at NIOSH and elsewhere. The BLS surveillance

data for the Services Sector between 2003 and 2007 were also summarized in a peer-review publication (Utterback, et al., 2012). At an April 2013 meeting of the sector council, the members reviewed the current status of the goals and recommended that some be inactivated because they had been achieved. Those changes are incorporated into this updated set of goals which also includes a set of new goals adopted by the council for the Hair and Nail Salon industry (NAICS 81211).

The industry experts, labor representatives, academic investigators and public health practitioners that make up the NORA Services Sector Council identified research and intervention goals for now 11 services industry sub sectors and for musculoskeletal disorders and occupational safety and health surveillance. The goals appear in the following order in this document:

1. Automotive Repair and Maintenance
2. Building Services
3. Education and Schools
4. Hotels and Motels
5. Public Administration (aka Government) except Public Safety
6. Recreation and Entertainment
7. Restaurants and Food Services
8. Telecommunications
9. Temporary Labor Industry
10. Waste Collection and Disposal
11. Musculoskeletal Disorders
12. Surveillance
13. Hair and Nail Salons

In June 2013, a review of pertinent literature was completed (Appendix). The purpose of the review was to identify completed research and intervention activities related to the individual goals in the National Services Agenda. The review was completed primarily through PubMed. Other sources at OSHA and NIOSH were reviewed primarily for intervention activities. The detailed results are in the Appendix by goal. Additional publications and intervention activities are likely to exist and the program is interested in learning about them. You may contact the program coordinator, David Utterback, with any products that should be added to the list at dfu0@cdc.gov.

The review led to decisions to retire some of the goals and label them as "accomplished." They have been greyed out in this version of the agenda. Research and intervention activities may continue to be beneficial on topics related to the accomplished goals but they are no longer considered priorities by the NORA Services Sector Council.

Resources

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Notes

Strategic goals target reductions in illnesses, injuries or fatalities of a certain percent. The **baseline** date for the reductions may be assumed to be 2006 unless otherwise specified.

Some goals may address **lost work day** injuries or illnesses, also known as **days-away-from-work**. The magnitude of the number of lost work days is a measure of the severity of the illness or injury although it may also be affected by the physical requirements of the particular job, among other factors.

Strategic goals for **Public Safety, Veterinary Services and Pet Care Services**, included in the NAICS industry codes for the NORA Services Sector, have been established by other Councils and appear in their documents.

AUTOMOTIVE REPAIR AND MAINTENANCE

The number of automotive service technicians and other mechanics employed in U.S. industries is estimated to be 1,682,000 (BLS, 2012a). The majority of these workers are employed by automotive repair shops and automotive dealers, with others being employed by transportation businesses, stores, gasoline stations, government agencies, and self-employment. Automotive technicians and other mechanics frequently work with dirty and greasy parts and in awkward positions. They often lift heavy parts and tools, and much of their work is strenuous and dirty. Automotive technicians and other mechanics are potentially exposed to solvent vapors, engine exhaust (carbon monoxide and diesel particulate), noise, asbestos fibers (during brake repair), isocyanates (during painting), epoxies, and cleaning agents. Injuries sustained by the workers include sprains and strains, chemical burns, bodily pain, carpal tunnel syndrome, bruises, cuts, and fractures (BLS 2011).

Strategic Goal 1: By 2015, reduce serious occupational illnesses and fatal occupational traumatic injuries by 30% in the automotive repair industry with an emphasis on events that are due to vehicle and equipment related incidents.

Accomplished – **Surveillance Goal 1.1:** By 2011, establish programs for the systematic collection and analysis of detailed fatality and serious injury investigation information in the automotive repair industry through the collaboration of employers, employees, workers' compensation insurance carriers, labor, academic institutions, and government agencies.

Accomplished – **Surveillance Goal 1.2:** By 2011, develop data systems to support the ongoing analysis of illnesses and traumatic injury risks and to identify issues for targeted intervention strategies through work with research and regulatory organizations and state based surveillance programs.

Surveillance Goal 1.3: By 2015, produce periodic summary reports of trends, emerging issues and intervention needs for the automotive repair industry.

Intermediate Goal 1.4: Develop and test targeted training materials and other intervention methods for the automotive repair industry to prevent traumatic injuries resulting from contact with objects and equipment.

Translation Goal 1.4.1: By 2015, identify the higher risk tasks or operations and effective communication channels for interventions by convening a workshop of stakeholders from the automotive repair industry, insurance carriers and government agencies.

Translation Goal 1.4.2**:** By 2015, develop effective health communication products that target exposures, tasks, operations or organizational factors associated with elevated risks for traumatic injuries in the automotive repair industry.

Intermediate Goal 1.5: Develop and test effective training materials, controls and comprehensive safety and health programs that reduce the risk of illness among automotive repair workers.

Accomplished – Research Goal 1.5.1**:** By 2013, conduct thorough investigations of potentially hazardous exposures to chemical and physical agents in automotive repair establishments, including body shops.

Accomplished – Research Goal 1.5.2: By 2011, identify compounds and processes that reduce the release of toxic agents in the workplace and in the waste stream which can be successfully used in automotive repair.

Research Goal 1.5.3**:** By 2015, evaluate the effectiveness of personal protective equipment that is commonly available and survey and identify reasons for non-use by workers in the automotive repair industry.

Accomplished – Research Goal 1.5.4**:** By 2012, ensure that new technologies in automotive products and automotive repair are appropriately vetted for occupational safety and health impact prior to marketing and dissemination.

Translation Goal 1.5.5**:** By 2015, develop hazard identification tools, checklists, and simple solution brochures that can be implemented with minimal training of employers, supervisors and workers.

Research Goal 1.5.6**:** By 2013, evaluate the effectiveness of interventions that are intended to reduce health effects associated with work organization and job and task designs in the automotive repair industry.

Accomplished – Dissemination Goal 1.5.7**:** By 2013, disseminate information on effective interventions in the automotive repair industry such as hazardous material control technologies and training programs.

BUILDING SERVICES

Approximately 2.5 million workers are employed in jobs classified in the building and landscape services industries (BLS 2012b). Building custodial services are often completed on evening and night shifts when building occupancy is low and building ventilation may be reduced to conserve energy expenditures. Workers who maintain building systems may complete construction-like tasks and are exposed to solvents, asbestos, microbial agents, and lead; janitors are exposed to chemicals in cleaning agents and physical strain; and landscapers are exposed to noise, pesticides and temperature extremes. Numerous safety hazards are present in this industry. The most common injuries are bodily pain, musculoskeletal disorders, and respiratory illnesses and dermatitis for janitors and falls and machinery-related injuries for maintenance and landscape workers. Nearly 200 fatalities occur in these industries each year (Utterback et al., 2012) and are associated with falls from heights, vehicle incidents and electrocutions, among others. Many of these workers are immigrants whose exposures and health outcomes are exacerbated due to factors such as lack of access to health care and worker's compensation benefits, poor housing, and limited income.

Strategic Goal 2: By 2015, reduce the incidence and severity of occupational illnesses and injuries by 20% as measured in number of occupational fatalities or lost work days among building services workers such as janitors, window washers, general building maintenance, and landscape services workers.

Surveillance Goal 2.1: Establish programs for collection and analysis of injury and illness event information, with standard elements for severity, among building services workers so that trends, emerging issues and intervention needs can be identified by 2015.

Intermediate Goal 2.2: Develop guidelines and training materials for effective injury interventions for building services workers.

Research Goal 2.2.1**:** By 2015, evaluate the effectiveness of intervention strategies and components of comprehensive health and safety programs to reduce injury risks for slips, trips and falls, falls from heights, and contact with equipment and objects among building cleaning and maintenance and landscape services employees.

Intermediate Goal 2.3: Create and disseminate information that will reduce risks for skin and respiratory disorders associated with building cleaning and maintenance work.

Accomplished – Research Goal 2.3.1**:** By 2011, identify agents such as cleaning compounds, pesticides, environmental tobacco smoke, and heat and the allied tasks or operations that may be associated with skin disorders or respiratory disease among various job titles for building cleaning and maintenance workers.

Research Goal 2.3.2**:** By 2011, conduct exposure assessments for jobs, tasks or cleaning operations during the use of potentially hazardous agents such as chlorine, ammonia, and glycol ethers inside building spaces.

Accomplished – Research Goal 2.3.3**:** By 2012, determine if some "environmentally sound" cleaning agents are less effective and may require increased physical effort to obtain acceptable levels of cleanliness. Identify effective cleaning agents which minimize effects on health and the environment.

Research Goal 2.3.4**:** By 2015, partner with EPA and GSA on best practices for building cleaning with inclusion of concepts such as adequate off-hours ventilation, evaluation of possible increased physical force requirements needed for "green" chemical cleaning agents, and reduction or control of toxic materials in cleaning agents such as glycol ethers in strong detergents and floor strippers.

Translation Goal 2.3.5**:** By 2013, ensure that recommendations and guidance products that are provided to building cleaning and maintenance workers are appropriate to the language(s) and literacy level of the workforce.

Dissemination Goal 2.3.6**:** By 2014, disseminate effective health communication materials to ensure that building cleaning and maintenance workers understand their rights to safe and healthy work environments as well as the need to report occupational injuries and illnesses to their employer in order to possibly qualify for workers' compensation insurance coverage.

Strategic Goal 3: Eliminate health disparities for priority population workers in building services industries by 2015.

Surveillance Goal 3.1: Ensure that employment, injury, illness and exposure assessment information is collected in sufficient detail for characterization of disparities in health status, if they exist, among building cleaning and maintenance workers.

Intermediate Goal 3.2: Work with stakeholders in the building services industries to develop training materials for supervisors and workers that address environmental, organizational and behavioral factors associated with health disparities, if any are found to exist.

Research Goal 3.2.1**:** By 2015, complete etiologic studies to characterize exposures and behavioral, organizational, and economic factors that may be related to health disparities among building services workers.

Translation Goal 3.2.2**:** By 2014, evaluate the effectiveness of training materials that address exposures and behavioral and organizational factors associated with disparities in health status among building services workers.

EDUCATION AND SCHOOLS

The educational services industry is the second largest U.S. industry with approximately 12.9 million workers (BLS, 2012b). The majority of workers are employed in elementary and secondary schools and post-secondary institutions and other education services employ approximately 4.4 million. Educational workers spend a significant amount of time in school buildings and in direct contact with students. As a result, they are potentially exposed to several hazards such as mold and microbial contaminants, infectious agents, hazardous volatile organic compounds emitted from construction materials and furniture, asbestos, and lead. Diesel exhaust is a common exposure from school buses. Work organization issues are challenging. Workers are at increased risk of respiratory illnesses, infectious diseases, other chronic diseases, voice disorders, stress and violence (Alexander, 2006).

Strategic Goal 4: By 2015, reduce the frequency and severity of injuries and illnesses by 30% among workers in public and private education including teachers, custodians, food service workers, nurses, security, support staff, garage mechanics, bus drivers and office workers.

Accomplished – **Surveillance Goal 4.1:** Ensure that health and safety surveillance systems are developed, implemented, and utilized to identify and track risks for injuries and illnesses among public and private education employees through partnerships with local, state and federal government agencies, labor unions, and professional associations by 2012.

Surveillance Goal 4.2: By 2010, develop recommendations for a voluntary web-based health and hazard surveillance system for education employees through collaboration of labor unions, education administrators, and state and federal government agencies.

Surveillance Goal 4.3: By 2015, evaluate incidence and prevalence of occupational respiratory disease, autoimmune diseases and reproductive health among public and private education staff.

Intermediate Goal 4.4: Create guidance documents for hazard identification and control and indoor air quality in public and private schools by 2015.

Research Goal 4.4.1**:** By 2015, characterize chemical, biological and physical hazards in school environments such as science laboratories, art studios, music rooms, hallways, classrooms, offices, sport arenas, transportation facilities, cafeterias and traffic and parking areas. Focus on special education and technical programs, such as auto and HVAC shops.

Accomplished – Translation Goal 4.4.2**:** By 2012, develop protocols for chemical, biological, and physical hazard assessment in education facilities that may be used with minimal training by school staff.

Accomplished – Translation Goal 4.4.3**:** By 2013, characterize the school building environment, develop best practices for building architecture and construction, and support wide utilization of these practices for new facilities and renovation of existing facilities. (For example, identify the best type of ventilation for teaching workshops or the best designed classrooms for students with special needs that promote learning while protecting worker health.)

Accomplished – Dissemination Goal 4.4.4: By 2014, deliver best practice guidelines for school construction and renovations through collaboration with the American Institute of Architects and the Sheet Metal and Air Conditioning Contractors' National Association.

Research Goal 4.4.5**:** By 2015, characterize the organization of work including stressors such as communication methods, violence, and lack of job control and define the essential elements of a healthy school work environment.

Intermediate Goal 4.5: Identify essential components of effective occupational health and safety programs in public and private education.

Research Goal 4.5.1**:** By 2013, evaluate the effectiveness of existing occupational health and safety programs in public and private education and identify best practices.

Dissemination Goal 4.5.2**:** By 2014, disseminate best practice guidelines for occupational health and safety programs in public and private education systems.

Research Goal 4.5.3**:** By 2015, evaluate the impact of effective occupational health and safety programs on employee health, overall education productivity, and costs.

HOTELS AND MOTELS

The number of workers employed in the hotel industry is estimated to be 1.8 million (BLS, 2012b). This industry employs a variety of workers – many are younger than 25 years, immigrants, first-time job holders, and may be employed part-time or on a seasonal basis. Hotel and motel workers are potentially exposed to several occupational physical and psychological stressors. Nearly all hotels and motels have continuous operations requiring shift work. Hotel room cleaners are at high risk of dermatitis and respiratory diseases due to exposure to cleaning agents and microbial agents in water damaged buildings. They are at high risk of musculoskeletal disorders due to awkward postures and frequent bending and lifting of heavy beds, linen, and carts. Work-loads may increase the risks for injuries (Buchanan et al., 2010).

Strategic Goal 5: By 2015, reduce the incidence and severity of occupational injuries by 20% as measured in lost work days among hotel and motel workers.

Surveillance Goal 5.1: Establish programs for collection and analysis of illness and injury event information, including standard elements for severity, in order to identify trends, emerging issues and intervention needs among hotel and motel employees.

Intermediate Goal 5.2: Develop guidelines and training materials for effective injury interventions for hotel and motel workers.

Research Goal 5.2.1**:** By 2015, evaluate the effectiveness of intervention strategies and components of comprehensive health and safety programs to reduce the risk of violence-related injuries and fatalities in the hotel industry.

Translation Goal 5.2.2**:** By 2015, develop guidelines for effective worker and supervisor training programs to reduce the risk of cuts and puncture wounds from hypodermic needles, broken glass and other sharp objects that may be present in hotel rooms and service areas.

Translation Goal 5.2.3**:** By 2015, develop implementation guidelines for programs that reduce the leading causes of slips, trips and falls among hotel employees.

Dissemination Goal 5.2.4: By 2015, disseminate guidelines for injury prevention among hotel and motel workers.

Strategic Goal 6: Reduce by 20% the incidence and severity of occupational illness and morbidity that result in lost work days among hotel and motel workers by 2015.

Intermediate Goal 6.1: Create and disseminate information to reduce risk for skin disorders, respiratory disease, stress-related disorders, adverse reproductive health outcomes, and musculoskeletal disorders associated with working conditions in hotels and motels.

Research Goal 6.1.1**:** By 2015, conduct exposure assessment and recommend substitutions and/or controls, as needed, for agents such as cleaning compounds, pesticides, environmental tobacco smoke, heat and the allied tasks, operations, and work conditions or organizations that may be associated with worker skin disorders, respiratory disease or stress-related disorders.

Research Goal 6.1.2**:** By 2015, determine if some "environmentally sound" cleaning agents used in hotels and motels are hazardous to users or require increased physical exertion to obtain acceptable levels of cleanliness. Identify effective cleaning agents which minimize impact on health and the environment.

Dissemination Goal 6.1.3**:** By 2015, ensure that recommendations, training materials and guidance products to reduce hazardous exposures among hotel and motel workers are language and literacy appropriate.

Dissemination Goal 6.1.4**:** By 2015, disseminate effective health communication materials to hotel industry workers at risk for musculoskeletal disorders to reduce exposures or to otherwise improve work practices, and document changes in knowledge and behaviors among employers, supervisors and employees.

Dissemination Goal 6.1.5**:** By 2015, disseminate effective health communication materials to ensure that workers understand their rights to safe and healthy work environments as well as the right to report occupational injuries and illnesses to their employer in order to possibly qualify for workers' compensation insurance coverage.

Strategic Goal 7: Eliminate health disparities for priority population workers in the hotel and motel industry by 2015.

Intermediate Goal 7.1: Develop training materials for supervisors and workers that address environmental, organizational, and behavioral factors associated with health disparities, if any are found to exist, among hotel and motel workers.

Research Goal 7.1.1**:** By 2015, complete etiologic studies among hotel and motel workers to characterize exposures and behavioral, organizational, and economic factors that may be related to health disparities.

Translation Goal 7.1.2**:** By 2015, evaluate the effectiveness of training materials that address exposures and behavioral and organizational factors associated with disparities in health status among hotel and motel workers to ensure that they are appropriate to the language(s) and literacy level of the workforce.

PUBLIC ADMINISTRATION (Except Public Safety)

Workers in the public administration include employees in the executive and legislative bodies, general government support, and American Indian Tribal government. Excluding public safety workers, there are over 4 million public administration workers in the U.S. (BLS, 2012b). In many states, the state government is the single largest employer. Information on numbers of occupational injuries to workers in public administration is very limited and state and local workers are frequently exempted from Federal occupational safety and health standards. The limited available surveillance information indicates that these workers may be at risk for respiratory illnesses, musculoskeletal disorders, and vehicle incidents. Public buildings are often less well maintained than private buildings, leading to indoor environmental quality concerns. Many government functions are continuous and involve contact with the public and extensive shift work.

Strategic Goal 8: Reduce by 30% the frequency and severity of injuries and illnesses among government workers by 2015.

Accomplished – **Surveillance Goal 8.1**: Ensure that health and safety surveillance systems are developed, implemented, and utilized to identify and track risks for illnesses and injuries among government employees.

Surveillance Goal 8.2: By 2015, evaluate incidence, prevalence and severity of musculoskeletal disorders and the physical hazards that are associated with the disorders among public administration employees.

Intermediate Goal 8.3: Create guidance documents for hazard identification and control, indoor air quality, occupational stress, and workplace violence in government work environments.

Research Goal 8.3.1: On an ongoing basis, characterize chemical, biological and physical hazards including potential reproductive toxins in governmental work environments such as science laboratories, transportation facilities, office buildings, cafeterias and traffic and parking areas.

Translation Goal 8.3.2: By 2015, develop protocols for chemical, biological, and physical hazard assessment in government facilities that may be used with minimal training by staff.

Research Goal 8.3.3: By 2015, evaluate existing violence prevention programs for government facilities and determine best practices for dissemination to all government agencies.

Research Goal 8.3.4: By 2015, characterize the relationship between occupational stress, work organization factors, shift work, psychological demands, decision latitude, social support, job insecurity and physical demands among government employees and measures of absenteeism and presenteeism (i.e. working while ill or injured).

Translation Goal 8.3.5: On an ongoing basis, ensure that health-risk implications of completed research projects are clearly understood by other research organizations, government agencies and professional organizations through peer-reviewed publications, presentations at national and international meetings, and guidance provided to health and safety practitioners.

RECREATION AND ENTERTAINMENT

It is estimated that 3.0 million persons are employed in the recreation and entertainment industry (BLS, 2012b). A large proportion of this worker population is under 35 years of age, and many are part-time and/or seasonal workers. Persons are employed in various industries such as spectator sports, amusement parks, gambling, live performances/events, exhibits (cultural or educational), and recreation or leisure-time activities. Many entertainment and recreation facilities operate multiple shifts. The overall rate of injuries in these workers is higher than for the entire U.S. private sector. The workers are potentially exposed to noise, engine exhaust, cleaning agents, environmental tobacco smoke and various safety risks such as falls, contact with objects and equipment, and violence (BLS, 2011).

Strategic Goal 9: By 2015, reduce traumatic injuries and fatalities by 30% in the recreation and entertainment industries.

Accomplished – **Surveillance Goal 9.1:** Identify and analyze sources of information that may be used to develop estimates of traumatic injury rates for workers in the recreation and entertainment industries. Estimate the risk of injury for youth, immigrant, and temporary workers in the recreation and entertainment industry.

Intermediate Goal 9.2: Develop and promote best practice guidelines to prevent injuries from over exertion, adverse bodily reaction, falls, and contact with equipment and objects in the recreation and entertainment industry.

Research Goal 9.2.1: By 2015, analyze injury surveillance data to identify causal patterns and the leading tasks or operations that are associated with injuries from over exertion, adverse bodily reactions, falls, and contact with equipment and objects that lead to serious traumatic injuries or fatalities in the recreation and entertainment industry.

Research Goal 9.2.2: By 2015, evaluate youth worker risks for traumatic injuries from over exertion and heat stress in the recreation and entertainment industry.

Research Goal 9.2.3: By 2015, conduct workshops, industry surveys, and literature review to determine the concerns and issues from industry experts in order to create best practices and recommendations.

Translation Goal 9.2.4: By 2015, develop evidence-based recommendations and/or best practice guidelines to prevent injuries due to over exertion, adverse bodily reaction, falls, and contact with equipment and objects and disseminate the guidelines.

Research Goal 9.2.5: By 2015, pilot and test interventions aimed at reducing injuries from over exertion, adverse bodily reaction, falls, and contact with equipment and objects in the recreation and entertainment industry.

Translation Goal 9.2.6: By 2015, develop evidence based recommendations and best practices for equipment operations to reduce the risks for injuries in the recreation and entertainment industries.

Accomplished – **Intermediate Goal 9.3:** Develop and promote guidelines to reduce exposures to hazardous agents associated with internal combustion engines and other sources in the recreation and entertainment industry.

Accomplished – Research Goal 9.3.1: By 2012, identify effective interventions to reduce exposures to engine exhaust from performance vehicles and maintenance equipment that are operated indoors.

Accomplished – Research Goal 9.3.2: By 2013, evaluate noise exposures for workers in the recreation and entertainment industry and develop guidelines for control of excessive noise exposures.

RESTAURANTS AND FOOD SERVICES

Approximately 8.7 million persons are employed in full-service and limited-service restaurants (BLS, 2012b). Many of these workers are young (i.e., <18 years of age), and in certain locations, the majority includes minorities or immigrants. Increasingly, workers with disabilities are being employed. Restaurants frequently operate with multiple shifts and some are open continuously. Waiters, cooks and food preparation workers experience a large proportion of injuries. The most common injuries include cuts and lacerations; burns caused by steam, grease, hot liquid, flame, or hot surfaces; and falls which are related to floor surface contamination. Violence is the most common cause of fatalities in the industry (Utterback et al., 2012) and accounted for 315 deaths between 2008 and 2011. Musculoskeletal disorders in this industry are associated with slips and trips and with overexertion (BLS, 2011).

Strategic Goal 10: By 2015, reduce the frequency of injuries by 30% among food service workers.

Accomplished – **Surveillance Goal 10.1:** Identify sources of information that can be used to estimate the frequency of injuries to populations of youth, immigrant and disabled workers in the food service industry.

Surveillance Goal 10.2: By 2015, evaluate differences in injury frequencies, rates, and severity for youth, immigrant and disabled employees in restaurants and other food service establishments when compared with the total workforce.

Intermediate Goal 10.3: Promote the development of comprehensive occupational safety and health programs for restaurants and other food service establishments.

Accomplished – Research Goal 10.3.1**:** By 2011, complete benchmarks of comprehensive occupational safety and health programs for small business food service

establishments and identify best practices that lead to reduced frequencies of injuries, with particular attention paid to youth, immigrant and disabled worker training methods.

Research Goal 10.3.2**:** By 2015, create and test training materials that are appropriate for the learning and retention skills of youth, immigrant, and disabled workers in the food service industry.

Research Goal 10.3.3**:** By 2015, complete field studies of exposures to temperature extremes and noise among food service workers and create recommendations for effective controls of these occupational hazards, as needed.

Accomplished – Translation Goal 10.3.4**:** By 2012, create guidance for small business food service establishments on occupational safety and health programs to be disseminated through trade associations and government agencies.

Dissemination Goal 10.3.5**:** By 2013, collaborate with food service inspection organizations or agencies as partners to provide information to restaurants and other food service establishments on effective occupational safety and health programs.

Accomplished – Translation Goal 10.3.6**:** by 2010, develop and disseminate effective disaster response plans for food service and drinking establishments.

Strategic Goal 11: By 2015, reduce the frequency of workplace violence events by 20% in restaurants and food delivery services.

Intermediate Goal 11.1: Create and promote acceptable and effective violence prevention strategies for restaurants and for food delivery services.

Research Goal 11.1.1**:** By 2015, evaluate barriers to the adoption of violence prevention strategies by restaurants and develop alternative interventions to overcome the barriers.

Research Goal 11.1.2**:** By 2015, test the effectiveness of violence prevention programs for food delivery services.

Dissemination Goal 11.1.3**:** By 2015, deliver effective violence intervention information to owners, managers and employees of restaurants and drinking establishments.

TELECOMMUNICATIONS

Workers in the telecommunications industry number about 1.0 million (BLS, 2012b) and include line and equipment installers and repairers, telephone operators, information processing clerks, managers, and administrative workers (BLS, 2012a). Line installers and repairers work in all kinds of weather and are in close proximity with electrical wires. Injuries include minor burns and electrical shock (BLS, 2011). Telephone operators and information processing clerks are exposed to work organizational issues such as fast pace of job and micro-management.

Strategic Goal 12: Reduce the incidence of serious occupational illnesses and injuries by 70% within the telecommunications industry by 2015.

Intermediate Goal 12.1: Develop and promote guidelines for reducing illnesses and injuries in the telecommunications industry that are associated with work organization factors,

physical hazards associated with musculoskeletal disorders, shift work, work load, work pace, training, and indoor air quality.

Research Goal 12.1.1**:** By 2015, characterize the relationship between occupational stress, worker productivity, work organization, shift work, psychological demands, decision latitude, social support, job insecurity and physical demands in the telecommunications industry and measures of absenteeism and presenteeism (i.e. working while ill or injured).

Dissemination Goal 12.1.2**:** By 2015, create and disseminate health communication documents about musculoskeletal disorder symptoms emphasizing the need for recording information for workers who complete repetitive tasks in office settings.

Translation Goal 12.1.3**:** By 2015, create guidelines for reducing occupational stress among workers in the telecommunications industry who complete repetitive tasks in office settings.

Research Goal 12.1.4**:** By 2016, evaluate the interactions among work organizations, physical and psychosocial factors, and non-work exposures in the development of non-traumatic musculoskeletal disorders and possible adverse reproductive health outcomes in the telecommunications industry.

Translation Goal 12.1.5: By 2016, create health communication documents that inform workers in the telecommunications industry about the possible roles of work organization and physical ergonomics in the development of occupational stress and its relationship with musculoskeletal disorders and symptoms.

Translation Goal 12.1.6: By 2015, ensure that health communication documents about work organization, shift work, physical ergonomics, job stress and musculoskeletal disorders in the telecommunications industry emphasize the need to report, record, and maintain information about worker tasks, exposures and symptoms or medical diagnoses.

Dissemination Goal 12.1.7: By 2016, disseminate all health communication documents to telecommunications industry employees and employers through trade associations, labor unions, government agencies, and employers.

Accomplished – Research Goal 12.1.8**:** By 2012, determine the relationships between environmental conditions that are associated with good indoor air quality and the operational characteristics of building systems that control temperature, humidity and atmospheric gases and particulate for various building types.

Translation Goal 12.1.9**:** By 2015, establish guidelines based on research evidence and identified best practices such as the ASHRAE Indoor Air Quality Guidelines for maintaining or improving indoor air quality in office settings.

Strategic Goal 13: By 2014, reduce occupational traumatic injuries and fatalities by 70% in the telecommunications industries.

Intermediate Goal 13.1: Identify and prevent occupational fatalities in the telecommunications industries and develop evidence based recommendations and best practices guidelines.

Research Goal 13.1.1**:** By 2015, identify causal factors for and implement interventions to reduce falls from elevation, contact with electric power and vehicle and equipment incidents.

Translation Goal 13.1.2**:** By 2015, develop best practice guidelines for prevention of falls and contact with and/or exposure to electrical power and for safe vehicle and equipment operations and disseminate the documents.

TEMPORARY LABOR INDUSTRY

Little surveillance information on temporary workers is available. It is estimated that employment services employ 2.3 million persons (Luo et al., 2010). Occupational hazards in this industry include work organization issues, psychosocial factors, and violence among young workers. Other hazards are dependent on the work environment at the host establishment. There is inadequate safety and health training in this population of workers where socioeconomic and racial/ethnic disparities exist. Due to the temporary nature of the jobs, it is difficult to ascertain illness or injury rates.

Strategic Goal 14: Reduce the incidence by 30% and severity of injuries and illnesses among workers who are employees of temporary labor agencies or otherwise employed as contractors or contingent workers at host employer locations by 2015.

Surveillance Goal 14.1: Identify sources of information that can be used to estimate the number or proportion of workers in industry sectors who are employed in a temporary or other contingent status at host employer locations.

Surveillance Goal 14.2: Determine if differences are present in health status between temporary or contingent workers and the remaining workers in selected industries based on available surveillance data.

Intermediate Goal 14.3: Produce peer-reviewed journal articles on differences in exposures or health conditions that may be attributable to employment status for temporary or contingent workers and promote a set of best practice recommendations to reduce any differences.

Research Goal 14.3.1**:** By 2015, assess safety and health practices in the temporary labor industry such as pre-employment functional capacity evaluation, agency employer and host employer training programs, record keeping practices, and provision of personal protective and safety equipment, and develop model contractual language that addresses these issues.

Research Goal 14.3.2**:** By 2015, conduct investigations of comprehensive safety and health programs in industries with substantial populations of temporary or contingent workers and identify best practices for the shared occupational health and safety responsibilities of the temporary agency and the host employer.

Research Goal 14.3.3**:** By 2015, identify the more common language, literacy and cultural barriers to the success of health and safety training materials for temporary or contingent workers and identify best practices to ensure effective training methods.

Translation Goal 14.3.4**:** On an ongoing basis, develop and test targeted educational tools for temporary workers in jobs with greater risks and explain employee rights to a safe and healthful workplace.

WASTE COLLECTION AND DISPOSAL

There are an estimated 518,000 workers employed in waste collection, treatment and disposal, and waste remediation, all in the private sector (BLS, 2012b). Waste collection and disposal employees include private sector and public sector (municipal) workers but population estimates for the latter are not available. Waste collectors work on public roadways, often at night or in extreme weather conditions, have physically demanding workloads, and are potentially exposed to hazardous substances. Waste collection and disposal workers are at risk for occupational injuries including fractures and sprains, bodily pain, musculoskeletal disorders, and traumatic injuries from being struck by objects, their own equipment or vehicles driven by members of the public (NIOSH, 2012).

Strategic Goal 15: Reduce the incidence and severity of injuries in the waste collection, disposal and recycling industries by 30%. (Stakeholders include large private haulers, regional and local haulers, public and private employee representatives, vehicle and equipment manufacturers, large and small municipalities, waste disposal organizations, and waste processing organizations.)

Surveillance Goal 15.1: Track industry-wide fatality and injury event information, including standard elements for injury severity.

Intermediate Goal 15.2: Create an industry-wide council, including management and worker representatives, to collaborate on developing comprehensive health and safety guidelines or standards for the solid waste industry.

Accomplished – Translation Goal 15.2.1**:** By 2011, create and disseminate health communication materials promoting adherence to safety and health requirements, e.g., ANSI, DOT (hours of service, driver qualification, and drug and alcohol testing) and Federal and State OSHA through trade associations, labor unions, and government agencies.

Translation Goal 15.2.2: On an ongoing basis, promote adoption of automated services for collection of solid wastes from residential areas wherever feasible or the adoption of automated lift systems on rear-load trucks.

Intermediate Goal 15.3: Create, disseminate, and evaluate the effectiveness of best practices guidance documents for the solid waste industry.

Research Goal 15.3.1**:** By 2015, identify the leading barriers to adoption of health and safety guidelines and standards, such as costs, communication methods or acceptance by management, employees, or the general public.

Translation Goal 15.3.2**:** By 2015, document success stories, describe the most effective intervention methods such as training programs, and disseminate the health communication materials.

Accomplished – Research Goal 15.3.3**:** By 2010, evaluate waste collection worker safety and health public education campaigns for roadway hazards such as "Slow Down to Get Around" that are designed to increase public cooperation.

Translation Goal 15.3.4**:** By 2014, continue a national public education campaign to emphasize the need for drivers to be alert and to exercise caution when moving past waste collection vehicles operating on or near public roadways.

Research Goal 15.3.5**:** By 2015, test the effectiveness of existing injury prevention programs and develop training curricula for new employees (regular and temporary) and refresher courses, by job task, for the hauling, collection, disposal, and recycling industry segments.

Accomplished – Dissemination Goal 15.3.6**:** By 2013, provide effective training materials for the solid waste industry through trade associations, labor unions, insurance companies, and government agencies.

Translation Goal 15.3.7**:** By 2015, promote the use of standard contract language for temporary workers to ensure that effective health and safety training and provision of necessary personal protective equipment is the responsibility of the host employer.

Intermediate Goal 15.4: Continue collaborations to identify, develop and incorporate engineering solutions to eliminate hazards for solid waste collection and disposal operations.

Accomplished – Research Goal 15.4.1**:** By 2011, evaluate the leading causes of injury risk to waste collection and disposal workers and develop reports on alternative designs to mitigate the recognized hazards.

Accomplished – Translation Goal 15.4.2**:** By 2013, collaborate with equipment and vehicle manufacturers to evaluate alternative designs intended to reduce the injury risk for solid waste collection and disposal workers.

Accomplished – Translation Goal 15.4.3**:** By 2014, incorporate effective equipment and vehicle design into industry guidelines and national or international standards for waste collection and disposal.

MUSCULOSKELETAL DISORDERS

Workers across many services sub sectors are engaged in tasks that have been associated with musculoskeletal disorders (MSDs). MSDs are injuries or inflammation of the nerves, tendons, muscles and support structures of the upper and lower limbs, neck, and lower back. The disorders are caused, precipitated or exacerbated by sudden exertion or prolonged exposure to physical factors such as repetition, force, vibration, or awkward posture. Many services sector workers are required to complete repetitive tasks and often exert considerable force in sometimes awkward positions.

Strategic Goal 16: By 2015, reduce by 30% the incidence of musculoskeletal disorders that result in one or more lost work days in services industry subsectors with elevated rates or counts or where effective intervention methods should be adopted.

Surveillance Goal 16.1: Develop and utilize state and federal injury, illness and disability surveillance systems on an ongoing basis and promote additional data analysis to increase

knowledge about trends, emerging issues and priorities for occupational musculoskeletal disorders among services sector workers.

Accomplished – **Surveillance Goal 16.2**: By 2014, evaluate existing data sets such as the National Health Interview Survey (NHIS), the Survey of Occupational Injuries and Illnesses (SOII) and state-based surveillance systems to identify industries or worker populations in the services sector with elevated risks for repetitive strain, upper extremity, lower extremity, lower back or other forms of musculoskeletal disorders.

Accomplished – **Intermediate Goal 16.3**: By 2013, ensure that reliable exposure assessment tools and strategies are developed and utilized to reduce musculoskeletal disorders through collaboration of academic institutions, management, labor, trade associations and government agencies.

Accomplished – Research Goal 16.3.1**:** By 2012, develop tools such as questionnaires and checklists for use in state and national surveys, hazard assessments, recognized "problem" work areas, and injury and symptom surveillance for musculoskeletal disorders in services sector industries.

Accomplished – Research Goal 16.3.2**:** By 2013, develop hazard surveillance checklists and similar tools that require minimal training for use by health and safety committees, employees, and medical personnel and validate them through field studies, exposure assessments, medical screenings and worker interviews.

Intermediate Goal 16.4: Develop, test, and disseminate effective intervention programs for services industries with higher risks for musculoskeletal disorders.

Research Goal 16.4.1**:** By 2015, evaluate associations between specific tasks, operations or work organization factors and the incidence of acute and chronic musculoskeletal disorders in at least 2 services sector industries such as automotive repair, building services, hotel, restaurants, and telecommunications.

Research Goal 16.4.2**:** On an ongoing basis, develop and test the effectiveness of targeted guidance programs for the reduction of repetitive strain and acute and chronic upper extremity, lower extremity, or lower back musculoskeletal disorders that are associated with hazardous tasks or operations in automotive repair, building services, hotel, restaurant, and other services sector industries.

Research Goal 16.4.3**:** On an ongoing basis, create economic analyses such as business case studies that demonstrate the effectiveness of practical solutions for reducing musculoskeletal disorders in services sector industries or occupations.

Translation Goal 16.4.4**:** On an ongoing basis, disseminate health communication campaigns for service sector industries and occupations with elevated risks for musculoskeletal disorders to reduce exposures or to otherwise improve work practices and document changes in knowledge and behaviors among employers, supervisors and employees.

Dissemination Goal 16.4.5**:** On an ongoing basis, support the exchange and use of effective prevention strategies with special emphasis on reaching employers, supervisors and workers in small businesses.

Intermediate Goal 16.5: Complete research projects with detailed analytical reports on the relationships between musculoskeletal disorders and working conditions for services sector industries and related occupations.

Research Goal 16.5.1: By 2014, evaluate the risks for occupational musculoskeletal disorders from repeated or sustained exertions among services sector workers such as room cleaners, janitors, automotive mechanics, customer service representatives and others.

Research Goal 16.5.2**:** By 2014, evaluate the roles of overexertion and awkward body position that may lead to occupational musculoskeletal disorders among services sector workers such as landscapers, solid waste collectors, and others.

Accomplished – Research Goal 16.5.3**:** By 2013, examine the risk of work-related musculoskeletal disorders for computer users with repetitive jobs associated with low-level static exertions and mental demands.

Research Goal 16.5.4**:** By 2015, evaluate the interaction of work organization and employer safety culture on the occurrence of musculoskeletal symptoms and long-term disability from work-related musculoskeletal disorders in services industries.

Translation Goal 16.5.5: On an ongoing basis, evaluate implementation of evidence based interventions aimed at mitigating physical hazards for work-related musculoskeletal disorders in the service sector workplace.

Translation Goal 16.5.6**:** On an ongoing basis, ensure that health-risk implications of completed research projects are clearly understood by other research organizations, government agencies and professional organizations.

SURVEILLANCE

Public health surveillance is the ongoing systematic collection, analysis, and interpretation of health data for purposes of improving health and safety (NIOSH, 2013). Occupational health surveillance can be viewed as the tracking of occupational injuries, illnesses, hazards, and exposures. Occupational surveillance data are used to guide efforts to improve worker safety and health, and to monitor trends and progress over time. Increased collection and analysis of data for surveillance purposes are needed across the services sector for the purpose of identifying priorities and tracking progress on all goals. The need is particularly important for occupational illness and exposure surveillance data.

Strategic Goal 17: Support the creation of additional surveillance systems and utilize existing surveillance data to increase knowledge about trends, emerging issues and priorities for occupational illnesses, injuries and fatalities among services sector workers.

Intermediate Goal 17.1: Evaluate illnesses, injuries, and fatalities that may be due to working conditions and identify opportunities for interventions in the services sector.

Accomplished – Research Goal 17.1.1: By 2008, develop a comprehensive list of recognized surveillance systems that have been or may be used to evaluate numbers and rates of illnesses, injuries, and fatalities by services industry or occupation.

Accomplished – Research Goal 17.1.2: By 2009, utilize state and national employment data to estimate the demographic and employment characteristics of the workers in the service sector.

Accomplished – Research Goal 17.1.3**:** Beginning in 2009, provide surveillance data analysis reports at least biannually to support priorities, and identify trends and emerging issues in the services sector.

Accomplished – Research Goal 17.1.4**:** By 2013, complete an analysis of occupational safety and health surveillance systems to determine the reliability of counts and rates for more serious injuries and illnesses.

Accomplished – Research Goal 17.1.5**:** By 2013, create recommendations to enhance the systematic collection of occupational illness and disease incidence data and injury data for populations who are not included in current national surveys such as public administration workers and many education sector employees.

Research Goal 17.1.6**:** By 2014, develop a program proposal for a population-based occupational illness surveillance system that uses annual questionnaires to collect data.

Intermediate Goal 17.2: Collaborate with workers' compensation and other insurance programs to collect and systematically analyze occupational illness and injury surveillance information to identify health and safety intervention needs for services sector workers.

Accomplished – Research Goal 17.2.1**:** By 2010, evaluate strategies that may be used to develop standard elements for injury severity in addition to frequency and duration of days-away-from-work events.

Accomplished – Research Goal 17.2.2**:** By 2011, collaborate with state health and labor departments where they have direct relationships with state-managed workers' compensation programs to develop strategies for data sharing, analysis and reporting with a primary interest in identifying needs for effective interventions.

Research Goal 17.2.3**:** By 2015, promote the collection of occupational injury, illness and disability information by state-managed workers compensation programs that would create reliable estimates of risks for contingent workers.

Research Goal 17.2.4**:** By 2015, develop a strategy to seek collaborative opportunities with private insurance carriers in order to aggregate illness, injury and disability data across states and identify priorities for effective intervention methods in services industries.

Research Goal 17.2.5**:** By 2015, evaluate the suitability of these data sources to identify health disparities and injury and illness rates among priority populations and contingent workers.

Intermediate Goal 17.3: By 2015, design and pilot test new methods of surveillance for occupational illness and injury among services sector workers.

Research Goal 17.3.1: By 2015, develop and test web-based survey methods of active surveillance for evidence of occupational illness or injury.

Research Goal 17.3.2: By 2015, develop and test uses of electronic medical records to identify potential occupational illness, e.g. adverse reproductive health outcomes, or injury.

HAIR AND NAIL SALONS

Personal care services employs approximately 1.45 million workers (BLS, 2012b). Most are employed in hair and nail salons. These workers are exposed to a wide variety of chemicals that are contained in the products they use to service clients. The chemicals potentially cause respiratory and dermal health effects and many may be allergenic. The workers also experience repetitive motion as well as awkward body positions. Remarkably, occupational fatalities among these workers are almost all violence related.

Strategic Goal 18: Reduce incidence of occupational illnesses and injuries by 20% in nail and hair salon workers by 2016.

Surveillance Goal 18.1: Establish programs for systematic collection and analysis of data on occupational illnesses and injuries in nail and hair salon workers and publish results in the open literature through collaboration of State and Federal programs.

Intermediate Goal 18.2: By 2016, minimize workplace exposures of harmful chemicals for nail and hair salon workers through the collaborative efforts of product manufacturers, suppliers, employers, employees and their representatives, and government agencies.

Research Goal 18.2.1: Complete representative exposure assessments of hazardous chemicals from nail and hair products with appropriate environmental sampling and biomonitoring methods.

Research Goal 18.2.2: Evaluate the potential relations between hazardous chemical exposures from nail and hair care products and illnesses and injuries in nail and hair salon workers.

Research Goal 18.2.3: Identify and test effective strategies to promote the use of less hazardous nail and hair care products and the adoption of best practices such as storage and handling of products, ventilation, and personal protective equipment use in nail and hair salons.

Translation Goal 18.2.4: By 2015, work with governmental agencies to establish practical protective guidelines for use of less hazardous chemicals and disseminate the information through trade associations, labor unions, and community groups.

Intermediate Goal 18.3: Assess the quality of nail and hair care product information available to nail and hair salon workers.

Research Goal 18.3.1: Conduct product testing of nail and hair care products to determine whether they contain hazardous chemicals and recommend less hazardous formulations.

Research Goal 18.3.2: Determine whether hazardous chemicals are identified appropriately on the product labels and material safety data sheets (MSDS).

Translation Goal 18.3.3: By 2015, ensure that MSDS for nail and hair products that are used within salons are accurate and contain proper health and safety information.

Intermediate Goal 18.4: By 2016, disseminate occupational injury prevention information for hair and nail salon establishments through collaborative efforts of product manufacturers, suppliers, employers, employees and their representatives, and government agencies.

Research Goal 18.4.1: Identify the leading risks for injuries among hair and nail salon workers such as: musculoskeletal disorders; slips, trips and falls; and workplace violence.

Translation Goal 18.4.2: Disseminate effective injury prevention information to employers and employees through product manufacturers, suppliers, trade associations, labor unions, and community groups.

APPENDIX: LITERATURE REVIEW BY GOAL

Summary list of published materials related to NORA Service Sector Agenda Goals

June 2013

The list below identifies research article citations and intervention materials links that have been produced since about 2007 which address goals in the National Services Agenda. The purpose for the list is to identify continuing gaps in research and intervention activities related to the services sector goals as well as to indicate where sufficient knowledge has been gained related to goals so they may no longer be a priority for the sector.

The goals in gray and marked 'Accomplished' are recommended for retirement while the other goals are in blue and will continue to be promoted by the Council. In addition, goals and related activities for the Hair and Nail Salon industry have been created by the NORA Services Sector Council. Those goals begin with Strategic Goal 18.

The method used to compile the list included a search of PubMed using a variety of key words related to services industries and topic identifiers related to occupational safety and health. In addition, announcements of the OSHA Susan Harwood Grant awardees were reviewed for years 2007 to 2012, the most recent awards available. Finally, the NIOSH surveillance page for State-based Occupational Health Surveillance Clearinghouse (http://wwwn.cdc.gov/niosh-survapps/statedocs/default.aspx) was searched for materials produced by state partners related to the services sector goals.

This method is not exhaustive. There may be many more scientific products that relate to the Services Sector goals. However, the list is an indication of the research and intervention activities by a large number of organizations that address the goals. Some products address more than a single goal and are listed in each location.

Additional publications and intervention activities are likely to exist and the program is interested in learning about them. You may contact the program coordinator, David Utterback, with any products that should be added to the list at dfu0@cdc.gov.

AUTOMOTIVE REPAIR AND MAINTENANCE

Accomplished – **Surveillance Goal 1.1:** By 2011, establish programs for the systematic collection and analysis of detailed fatality and serious injury investigation information in the automotive repair industry through the collaboration of employers, employees, workers' compensation insurance carriers, labor, academic institutions, and government agencies.

Accomplished – **Surveillance Goal 1.2:** By 2011, develop data systems to support the ongoing analysis of illnesses and traumatic injury risks and to identify issues for targeted intervention strategies through work with research and regulatory organizations and state based surveillance programs.

Michigan State University. Respiratory Hazards in the Automotive Industry. Project S. E.N.S.O.R. News. Volume 19, No. 2, Spring 2008. http://www.oem.msu.edu/userfiles/file/News/Sv19n2.pdf. Accessed July 25, 2013

Smith SM. Occupational Injuries, Illnesses, and Fatalities to Automotive Service Technicians and Mechanics, 2003 to 2005. U.S. Bureau of Labor Statistics, Washington DC, May 23, 2007. http://www.bls.gov/opub/cwc/sh20070521ar01p1.htm. Accessed May 25, 2013

Washington State Department of Labor & Industries. Preventing Injury and Illness in Auto Body Shops. Report# 69-5-2006, Safety & Health Assessment & Research for Prevention (SHARP), May 2006. http://www.lni.wa.gov/Safety/Research/Files/AutoBody.pdf. Accessed July 25, 2013

Surveillance Goal 1.3: By 2015, produce periodic summary reports of trends, emerging issues and intervention needs for the automotive repair industry.

National Institute for Occupational Safety and Health (NIOSH). Fact Sheet: Automotive Repair & Maintenance Services. DHHS (NIOSH) Publication No. 2012-114, 2012. http://www.cdc.gov/niosh/docs/2012-114/pdfs/2012-114.pdf. Accessed July 25, 2013

Massachusetts Department of Public Health. Mechanic Repairing a Multi Terrain Loader Pinned between the Loader's Lift Arm and Frame – Massachusetts. Occupational Health Surveillance Program, Investigation: # 09-MA-044-01, 2011. http://www.mass.gov/eohhs/docs/dph/occupational-health/lift-arm.pdf. Accessed June 3, 2013

California Fatality Assessment and Control Evaluation (CA/FACE) Program. A Mechanic Dies When He is Crushed by the Hydraulic Arm of a Recyclable Refuse Collection Truck. California FACE Report #10CA005, February 3, 2011. http://www.cdph.ca.gov/programs/ohb-face/Documents/10CA005.pdf. Accessed June 3, 2013

Mirabelli MC, London SJ, Charles LE, Pompeii LA, Wagenknecht LE. Occupation and three-year incidence of respiratory symptoms and lung function decline: the ARIC Study. Respir Res. 2012 Mar 20;13:24. http://dx.doi.org/10.1186/1465-9921-13-24.

Massachusetts Department of Public Health, Occupational Health Surveillance Program. Mechanic Dies while Changing a Tire Mounted on a Multi-piece Split Rim Wheel -

Massachusetts. Investigation: # 07-MA-058-01, October 20, 2009. http://www.mass.gov/eohhs/docs/dph/occupational-health/fatal-reports/fatal-report-split-rim.pdf. Accessed June 3, 2013

Intermediate Goal 1.4: Develop and test targeted training materials and other intervention methods for the automotive repair industry to prevent traumatic injuries resulting from contact with objects and equipment.

Translation Goal 1.4.2: By 2015, develop effective health communication products that target exposures, tasks, operations or organizational factors associated with elevated risks for traumatic injuries in the automotive repair industry.

Park Nicollet and Environmental Health Sciences Division University of Minnesota. Collision Auto Repair Safety Study (CARSS). http://www.repairsafety.com/. Accessed July 25, 2013

Health and Safety Executive (UK). Health and safety in motor vehicle repair and associated industries. HSG261, 2009. http://www.hse.gov.uk/pubns/books/hsg261.htm. Accessed June 4, 2013

Occupational Safety and Health Administration (OSHA). Autobody Repair and Refinishing. http://www.osha.gov/SLTC/autobody/index.html. Accessed June 4, 2013

National Institute for Occupational Safety and Health (NIOSH). Fact Sheet: Automotive Repair & Maintenance Services. DHHS (NIOSH) Publication No. 2012-114, 2012. http://www.cdc.gov/niosh/docs/2012-114/pdfs/2012-114.pdf. Accessed July 25, 2013

Intermediate Goal 1.5: Develop and test effective training materials, controls and comprehensive safety and health programs that reduce the risk of illness among automotive repair workers.

Accomplished – **Research Goal 1.5.1:** By 2013, conduct thorough investigations of potentially hazardous exposures to chemical and physical agents in automotive repair establishments, including body shops.

Park Nicollet and Environmental Health Sciences Division University of Minnesota. Collision Auto Repair Safety Study (CARSS). http://www.repairsafety.com/. Accessed July 25, 2013

Health and Safety Executive (UK). Health and safety in motor vehicle repair and associated industries. http://www.hse.gov.uk/pubns/books/hsg261.htm. Accessed June 4, 2013

Reeb-Whitaker C, Whittaker SG, Ceballos DM, Weiland EC, Flack SL, Fent KW, Thomasen JM, Trelles Gaines LG, Nylander-French LA. Airborne isocyanate exposures in the collision repair industry and a comparison to occupational exposure limits. J Occup Environ Hyg. 2012;9(5):329-39. http://dx.doi.org/10.1080/15459624.2012.672871.

Christopher Y, Van Tongeren M, Urbanus J, Cherrie JW. An assessment of dermal exposure to heavy fuel oil (HFO) in occupational settings. Ann Occup Hyg. 2011 Apr;55(3):319-28. http://dx.doi.org/10.1093/annhyg/mer002.

Flack SL, Ball LM, Nylander-French LA. Occupational exposure to HDI: progress and challenges in biomarker analysis. J Chromatogr B Analyt Technol Biomed Life Sci. 2010 Oct 1;878(27):2635-42. http://dx.doi.org/10.1016/j.jchromb.2010.01.012.

Liu Y, Stowe MH, Bello D, Sparer J, Gore RJ, Cullen MR, Redlich CA, Woskie SR. Skin exposure to aliphatic polyisocyanates in the auto body repair and refinishing industry: III. A personal exposure algorithm. Ann Occup Hyg. 2009 Jan;53(1):33-40. http://dx.doi.org/10.1093/annhyg/men070.

Bello D, Redlich CA, Stowe MH, Sparer J, Woskie SR, Streicher RP, Hosgood HD, Liu Y. Skin exposure to aliphatic polyisocyanates in the auto body repair and refinishing industry: II. A quantitative assessment. Ann Occup Hyg. 2008 Mar;52(2):117-24. http://dx.doi.org/10.1093/annhyg/mem066.

Woskie SR, Bello D, Gore RJ, Stowe MH, Eisen EA, Liu Y, Sparer JA, Redlich CA, Cullen MR. Comparison of task-based exposure metrics for an epidemiologic study of isocyanate inhalation exposures among autobody shop workers. J Occup Environ Hyg. 2008 Sep;5(9):588-98. http://dx.doi.org/10.1080/15459620802275429.

Blake CL, Dotson GS, Harbison RD. Evaluation of asbestos exposure within the automotive repair industry: a study involving removal of asbestos-containing body sealants and drive clutch replacement. Regul Toxicol Pharmacol. 2008 Dec;52(3):324-31. http://dx.doi.org/10.1016/j.yrtph.2008.09.001.

Velázquez L, Bello D, Munguia N, Zavala A, Marin A, Moure-Eraso R. A survey of environmental and occupational work practices in the automotive refinishing industry of a developing country: Sonora, Mexico. Int J Occup Environ Health. 2008 Apr-Jun;14(2):104-11. http://www.ncbi.nlm.nih.gov/pubmed/18507286.

Accomplished – **Research Goal 1.5.2:** By 2011, identify compounds and processes that reduce the release of toxic agents in the workplace and in the waste stream which can be successfully used in automotive repair.

Health and Safety Executive (UK). Health and safety in motor vehicle repair and associated industries. HSG261, 2009. http://www.hse.gov.uk/pubns/books/hsg261.htm. Accessed June 4, 2013

Coordinating Committee for Automotive Repair (CCAR). Safety, Environmental & Hazardous Material Training. http://ccar-greenlink.org/ (Subscription service). Accessed July 25, 2013

Yakut Y, Uçmak D, Akkurt ZM, Akdeniz S, Palanci Y, Sula B. Occupational skin diseases in automotive industry workers. Cutan Ocul Toxicol, Early Online, 2013 May 2. http://dx.doi.org/10.3109/15569527.2013.787088. Accessed July 25, 2013

Labrecque M. Irritant-induced asthma. Curr Opin Allergy Clin Immunol. 2012 Apr;12(2):140-4. http://dx.doi.org/10.1097/ACI.0b013e32835143b8.

Ceballos DM, Yost MG, Whittaker SG, Reeb-Whitaker C, Camp J, Dills R. Development of a permeation panel to test dermal protective clothing against sprayed coatings. Ann Occup Hyg. 2011 Mar;55(2):214-27. http://dx.doi.org/10.1093/annhyg/meq081.

Brosselin P, Rudant J, Orsi L, Leverger G, Baruchel A, Bertrand Y, Nelken B, Robert A, Michel G, Margueritte G, Perel Y, Mechinaud F, Bordigoni P, Hémon D, Clavel J. Acute childhood leukaemia and residence next to petrol stations and automotive repair garages: the ESCALE study (SFCE). Occup Environ Med. 2009 Sep;66(9):598-606. http://dx.doi.org/10.1136/oem.2008.042432.

Ceballos DM, Yost MG, Whittaker SG, Camp J, Dills R. Objective color scale for the SWYPE surface sampling technique using computerized image analysis tools. J Occup Environ Hyg. 2009 Oct;6(10):604-11. http://dx.doi.org/10.1080/15459620903117710.

Finkelstein MM. Asbestos fibre concentrations in the lungs of brake workers: another look. Ann Occup Hyg. 2008 Aug;52(6):455-61. http://dx.doi.org/10.1093/annhyg/men036.

Boeniger M, Neumeister C, Booth-Jones A. Sampling and analytical method development and hand wipe measurements of dermal exposures to polycyclic aromatic hydrocarbons. J Occup Environ Hyg. 2008 Jul;5(7):417-25. http://dx.doi.org/10.1080/15459620802111319.

Bello D, Herrick CA, Smith TJ, Woskie SR, Streicher RP, Cullen MR, Liu Y, Redlich CA. Skin exposure to isocyanates: reasons for concern. Environ Health Perspect. 2007 Mar;115(3):328-35. http://dx.doi.org/10.1289/ehp.9557.

Accomplished – **Research Goal 1.5.4:** By 2012, ensure that new technologies in automotive products and automotive repair are appropriately vetted for occupational safety and health impact prior to marketing and dissemination.

Health and Safety Executive (UK). Health and safety in motor vehicle repair and associated industries. HSG261, 2009. http://www.hse.gov.uk/pubns/books/hsg261.htm. Accessed June 4, 2013

Occupational Safety and Health Administration (OSHA). Autobody Repair and Refinishing. http://www.osha.gov/SLTC/autobody/index.html. Accessed May 29, 2013

Coordinating Committee for Automotive Repair (CCAR). Safety, Environmental & Hazardous Material Training. http://ccar-greenlink.org/ (Subscription service). Accessed July 25, 2013

Accomplished – **Dissemination Goal 1.5.7:** By 2013, disseminate information on effective interventions in the automotive repair industry such as hazardous material control technologies and training programs.

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BUILDING SERVICES

Surveillance Goal 2.1: Establish programs for collection and analysis of injury and illness event information, with standard elements for severity, among building services workers so that trends, emerging issues and intervention needs can be identified.

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Intermediate Goal 2.2: Develop guidelines and training materials for effective injury interventions for building services workers.

Research Goal 2.2.1: By 2015, evaluate the effectiveness of intervention strategies and components of comprehensive health and safety programs to reduce injury risks for slips, trips and falls, falls from heights, and contact with equipment and objects among building cleaning and maintenance and landscape services employees.

Occupational Safety and Health Administration. FY2012 Developmental Follow-on Susan Harwood Grant to Interfaith Worker Justice, Chicago, IL, $181,388. The grantee will provide worker and train-the-trainer training that addresses specific health and safety hazards in construction, cleaning service, poultry/meat packing, restaurants, landscaping, and home care. Training will target non-English speaking/limited English proficiency workers, non-literate and low literacy workers, young workers, and hard-to-reach workers. Training and materials will be available in English and Spanish. https://www.osha.gov/dte/sharwood/2012_grant_recipients.html. Accessed July 29, 2013

Occupational Safety and Health Administration. FY2012 Developmental Follow-on Susan Harwood Grant to Hispanic Resource Center of Larchmont and Mamaroneck, Mamaroneck, NY, $88,350. The grantee will provide training in each of four topics: landscaping, falls in the workplace, chemical hazards, lead and asbestos removal. Training targets new immigrant, limited English speakers and low literacy immigrant workers including day laborers and domestic workers. Training and materials will be available in English and Spanish. https://www.osha.gov/dte/sharwood/2012_grant_recipients.html. Accessed July 29, 2013

Occupational Safety and Health Administration. FY2012 Developmental Follow-on Susan Harwood Grant to Casa Latina, Seattle, WA, $152,000. The grantee will offer 4-hour health and safety training for day laborers working in the construction, moving, and gardening/landscaping industries in King County, Washington. Topics will include lifting heavy objects, eye hazards, airborne chemicals/dust, noise, chemicals, working at heights, and weather protection. https://www.osha.gov/dte/sharwood/2012_grant_recipients.html. Accessed July 29, 2013

Occupational Safety and Health Administration. FY2012 Developmental Follow-on Susan Harwood Grant to CASA de Maryland, Inc., Hyattsville, MD, $181,390. The grantee will provide health and safety training to workers in the construction, building and ground maintenance, and warehouse industries. Training will target non-English speaking/limited English proficient, non-literate and low-literacy, and hard-to-reach workers in the state of Maryland. Training topics will include construction focus four hazards and heat and cold exposure hazards. https://www.osha.gov/dte/sharwood/2012_grant_recipients.html. Accessed July 29, 2013

Occupational Safety and Health Administration. 2010 Developmental Susan Harwood Grant to CASA de Maryland, Inc. (Central American Solidarity Association), Hyattsville, MD, $220,000. The grantee will provide training for high-risk Latino workers in the construction, building and grounds maintenance, agricultural, and warehouse industries in Maryland.

Training will be offered through local community colleges and employment centers. Training will include a train-the-trainer module. The training and/or materials will be offered in English and Spanish. https://www.osha.gov/dte/sharwood/2010_grant_recipients.html. Accessed July 29, 2013

Occupational Safety and Health Administration. FY2011 Developmental Follow-on Susan Harwood Grant to Regents of the University of California, The - Berkeley, Berkeley, CA, $187,000. The grantee will provide training to low-income, immigrant and youth workers employed in small businesses in Northern California. The target audiences are workers in nail salons, restaurants, janitorial services, residential care, and landscaping services. The training and/or materials will be offered in English, Vietnamese, and Spanish. https://www.osha.gov/dte/sharwood/2011_grant_recipients.html. Accessed July 29, 2013

Occupational Safety and Health Administration. FY2011 Developmental Follow-on Susan Harwood Grant to National Council for Occupational Safety and Health, Raleigh, NC, $663,000. The grantee will conduct training that targets high-risk vulnerable workers, especially those with limited English proficiency. Training will be provided by participating COSH groups. Training will include classes on hazards associated with maintenance, housekeeping, custodial, agricultural, and restaurant work. The training and/or materials will be offered in English and Spanish. https://www.osha.gov/dte/sharwood/2011_grant_recipients.html. Accessed July 29, 2013

Occupational Safety and Health Administration. FY2011 Developmental Follow-on Susan Harwood Grant to Interfaith Worker Justice, Chicago, IL, $186,998. The grantee will develop and provide safety training that targets low-wage, immigrant workers in construction, landscaping, poultry/meatpacking, restaurants, and cleaning services. The employer training will include how to develop or improve a safety and health program. The training and/or materials will be offered in English, Spanish and Polish. https://www.osha.gov/dte/sharwood/2011_grant_recipients.html. Accessed July 29, 2013

Occupational Safety and Health Administration. FY2011 Developmental Susan Harwood Grant to Hispanic Resource Center for Larchmont and Mamaroneck, Mamaroneck, NY, $93,000. The grantee will build long term health and safety capacity and provide safety training to workers in New York. Training topics will include fall protection, electrical safety, confined space, heat exposure, machine safety and chemical hazards. Training will target new immigrant Hispanic workers and day laborers in the construction and landscaping industries. Training and materials will be provided in Spanish. https://www.osha.gov/dte/sharwood/2011_grant_recipients.html. Accessed July 29, 2013

Occupational Safety and Health Administration. 2009 Susan Harwood Grant to The University of Georgia, Athens, GA, $250,000. The University will utilize training materials developed under a previous Harwood grant to provide bilingual training to landscape workers at workplaces and managers at trade shows. The University will also enhance their bilingual online video landscape safety training series by adding pictorial questions and evaluation components for online training. Four bilingual hands-on training sessions will be conducted for Atlanta-area tree service workers on chain saws, tree climbing and equipment, tree rigging and removal, and safe ground operations. https://www.osha.gov/dte/sharwood/2009_grant_recipients.html. Accessed July 29, 2013

Occupational Safety and Health Administration. 2009 Susan Harwood Grant to Kansas State University, Manhattan, KS, $153,762. The University will use grant training materials developed under a previous Harwood training grant. The materials were developed at an eigth-grade reading level in English/Spanish and include two-way dialogue, problem solving, demonstrations, hands-on and case studies. Twenty classes will be conducted at workplaces, trade shows, and other venues. The training length and content will vary to address needs of each trainee group. Available topics include hearing protection, tree-trimming safety, mowing safety, safety program management; and additional training topics can be added. https://www.osha.gov/dte/sharwood/2009_grant_recipients.html. Accessed July 29, 2013

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Intermediate Goal 2.3: Create and disseminate information that will reduce risks for skin and respiratory disorders associated with building cleaning and maintenance work.

Accomplished – **Research Goal 2.3.1:** By 2011, identify agents such as cleaning compounds, pesticides, environmental tobacco smoke, and heat and the allied tasks or operations that may be associated with skin disorders or respiratory disease among various job titles for building cleaning and maintenance workers.

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Research Goal 2.3.2: By 2011, conduct exposure assessments for jobs, tasks or cleaning operations during the use of potentially hazardous agents such as chlorine, ammonia, and glycol ethers inside building spaces.

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Accomplished – **Research Goal 2.3.3:** By 2012, determine if some "environmentally sound" cleaning agents are less effective and may require increased physical effort to obtain acceptable levels of cleanliness. Identify effective cleaning agents which minimize effects on health and the environment.

Green Seal. Institutional Cleaning Products. http://www.greenseal.org/FindGreenSealProductsandServices.aspx?vid=ViewProductDetail&cid=16. Accessed May 28, 2013

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training interventions at cleaning workplaces--secondary analyses of a randomised controlled trial. Ergonomics. 2012;55(7):762-72. http://dx.doi.org/10.1080/00140139.2012.665946.

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Translation Goal 2.3.5: By 2013, ensure that recommendations and guidance products that are provided to building cleaning and maintenance workers are appropriate to the language(s) and literacy level of the workforce.

NIOSH/OSHA. Protecting Workers Who Use Cleaning Chemicals. DHHS (NIOSH) Publication Number 2012-126; July 2012. http://www.cdc.gov/niosh/docs/2012-126/. Accessed July 26, 2013

NIOSH/OSHA. Protect Yourself: Cleaning Chemicals and Your Health. DHHS (NIOSH) Publication Number 2012-125; March 2012. http://www.cdc.gov/niosh/docs/2012-125/. Available in English, Spanish, Chinese and Tagalog. Accessed July 26, 2013

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New Jersey Public Health Services Branch. Los Productos de Limpieza el Asma: Informacion Impressindible para del trebajador. http://www.state.nj.us/health/eoh/survweb/wra/documents/wra_cleaning_products_sp.pdf, Spanish. Accessed May 28, 2013

Dissemination Goal 2.3.6: By 2014, disseminate effective health communication materials to ensure that building cleaning and maintenance workers understand their rights to safe and healthy work environments as well as the need to report occupational injuries and illnesses to their employer in order to possibly qualify for workers' compensation insurance coverage.

NIOSH/OSHA. Protecting Workers Who Use Cleaning Chemicals. DHHS (NIOSH) Publication Number 2012-126; July 2012. http://www.cdc.gov/niosh/docs/2012-126/. Accessed July 26, 2013

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California Department of Public Health. Cleaning Products and Work-Related Asthma. 2010. http://www.cdph.ca.gov/programs/ohsep/Documents/WRA-CleaningProd.pdf. Accessed May 28, 2013

Weisshaar E, Radulescu M, Soder S, Apfelbacher CJ, Bock M, Grundmann JU, Albrecht U, Diepgen TL. Secondary individual prevention of occupational skin diseases in health care workers, cleaners and kitchen employees: aims, experiences and descriptive results. Int Arch Occup Environ Health. 2007 May;80(6):477-84. http://dx.doi.org/10.1007/s00420-006-0154-z.

Intermediate Goal 3.2: Work with stakeholders in the building services industries to develop training materials for supervisors and workers that address environmental, organizational and behavioral factors associated with health disparities, if any are found to exist.

Research Goal 3.2.1: By 2015, complete etiologic studies to characterize exposures and behavioral, organizational, and economic factors that may be related to health disparities among building services workers.

Jørgensen MB, Rasmussen CD, Carneiro IG, Flyvholm MA, Olesen K, Ekner D, Søgaard K, Holtermann A. Health disparities between immigrant and Danish cleaners. Int Arch Occup Environ Health. 2011 Aug;84(6):665-74. http://dx.doi.org/10.1007/s00420-010-0607-2.

Gany F, Dobslaw R, Ramirez J, Tonda J, Lobach I, Leng J. Mexican urban occupational health in the US: a population at risk. J Community Health. 2011 Apr;36(2):175-9. http://dx.doi.org/10.1007/s10900-010-9295-9.

Sanders MJ, McCready J. A qualitative study of two older workers' adaptation to physically demanding work. Work. 2009;32(2):111-22. http://dx.doi.org/10.3233/WOR-2009-0797.

Kines P, Hannerz H, Mikkelsen KL, Tüchsen F. Industrial sectors with high risk of women's hospital-treated injuries. Am J Ind Med. 2007 Jan;50(1):13-21. http://dx.doi.org/10.1002/ajim.20408.

Translation Goal 3.2.2: By 2014, evaluate the effectiveness of training materials that address exposures and behavioral and organizational factors associated with disparities in health status among building services workers.

Occupational Safety and Health Administration. FY2012 Developmental Follow-on Susan Harwood Grant to Interfaith Worker Justice, Chicago, IL, $181,388. The grantee will provide worker and train-the-trainer training that addresses specific health and safety hazards in construction, cleaning service, poultry/meat packing, restaurants, landscaping, and home care. Training will target non-English speaking/limited English proficiency workers, non-literate and low literacy workers, young workers, and hard-to-reach workers. Training and materials will be available in English and Spanish. https://www.osha.gov/dte/sharwood/2012_grant_recipients.html. Accessed July 29, 2013

Occupational Safety and Health Administration. FY2012 Developmental Follow-on Susan Harwood Grant to Hispanic Resource Center of Larchmont and Mamaroneck, Mamaroneck, NY, $88,350. The grantee will provide training in each of four topics: landscaping, falls in the workplace, chemical hazards, lead and asbestos removal. Training targets new immigrant, limited English speakers and low literacy immigrant workers including day laborers and domestic workers. Training and materials will be available in English and Spanish. https://www.osha.gov/dte/sharwood/2012_grant_recipients.html. Accessed July 29, 2013

Occupational Safety and Health Administration. FY2012 Developmental Follow-on Susan Harwood Grant to Casa Latina, Seattle, WA, $152,000. The grantee will offer 4-hour health and safety training for day laborers working in the construction, moving, and gardening/landscaping industries in King County, Washington. Topics will include lifting heavy objects, eye hazards, airborne chemicals/dust, noise, chemicals, working at heights,

and weather protection. https://www.osha.gov/dte/sharwood/2012_grant_recipients.html. Accessed July 29, 2013

Occupational Safety and Health Administration. FY2012 Developmental Follow-on Susan Harwood Grant to CASA de Maryland, Inc., Hyattsville, MD, $181,390. The grantee will provide health and safety training to workers in the construction, building and ground maintenance, and warehouse industries. Training will target non-English speaking/limited English proficient, non-literate and low-literacy, and hard-to-reach workers in the state of Maryland. Training topics will include construction focus four hazards and heat and cold exposure hazards. https://www.osha.gov/dte/sharwood/2012_grant_recipients.html. Accessed July 29, 2013

Occupational Safety and Health Administration. 2010 Developmental Susan Harwood Grant to CASA de Maryland, Inc. (Central American Solidarity Association), Hyattsville, MD, $220,000. The grantee will provide training for high-risk Latino workers in the construction, building and grounds maintenance, agricultural, and warehouse industries in Maryland. Training will be offered through local community colleges and employment centers. Training will include a train-the-trainer module. The training and/or materials will be offered in English and Spanish. https://www.osha.gov/dte/sharwood/2010_grant_recipients.html. Accessed July 29, 2013

Occupational Safety and Health Administration. FY2011 Developmental Follow-on Susan Harwood Grant to Regents of the University of California, The - Berkeley, Berkeley, CA, $187,000. The grantee will provide training to low-income, immigrant and youth workers employed in small businesses in Northern California. The target audiences are workers in nail salons, restaurants, janitorial services, residential care, and landscaping services. The training and/or materials will be offered in English, Vietnamese, and Spanish. https://www.osha.gov/dte/sharwood/2011_grant_recipients.html. Accessed July 29, 2013

Occupational Safety and Health Administration. FY2011 Developmental Follow-on Susan Harwood Grant to National Council for Occupational Safety and Health, Raleigh, NC, $663,000. The grantee will conduct training that targets high-risk vulnerable workers, especially those with limited English proficiency. Training will be provided by participating COSH groups. Training will include classes on hazards associated with maintenance, housekeeping, custodial, agricultural, and restaurant work. The training and/or materials will be offered in English and Spanish. https://www.osha.gov/dte/sharwood/2011_grant_recipients.html. Accessed July 29, 2013

Occupational Safety and Health Administration. FY2011 Developmental Follow-on Susan Harwood Grant to Interfaith Worker Justice, Chicago, IL, $186,998. The grantee will develop and provide safety training that targets low-wage, immigrant workers in construction, landscaping, poultry/meatpacking, restaurants, and cleaning services. The employer training will include how to develop or improve a safety and health program. The training and/or materials will be offered in English, Spanish and Polish. https://www.osha.gov/dte/sharwood/2011_grant_recipients.html. Accessed July 29, 2013

Occupational Safety and Health Administration. FY2011 Developmental Susan Harwood Grant to Hispanic Resource Center for Larchmont and Mamaroneck, Mamaroneck, NY, $93,000. The grantee will build long term health and safety capacity and provide safety training to workers in New York. Training topics will include fall protection, electrical

safety, confined space, heat exposure, machine safety and chemical hazards. Training will target new immigrant Hispanic workers and day laborers in the construction and landscaping industries. Training and materials will be provided in Spanish. https://www.osha.gov/dte/sharwood/2011_grant_recipients.html. Accessed July 29, 2013

EDUCATION AND SCHOOLS

Accomplished – **Surveillance Goal 4.1:** Ensure that health and safety surveillance systems are developed, implemented, and utilized to identify and track risks for injuries and illnesses among public and private education employees.

Ervasti J, Kivimäki M, Kawachi I, Subramanian SV, Pentti J, Ahola K, Oksanen T, Pohjonen T, Vahtera J, Virtanen M. Pupils with special educational needs in basic education schools and teachers' sickness absences--a register-linkage study. Scand J Work Environ Health. 2012 May;38(3):209-17. http://dx.doi.org/10.5271/sjweh.3281.

Ervasti J, Kivimäki M, Kawachi I, Subramanian SV, Pentti J, Oksanen T, Puusniekka R, Pohjonen T, Vahtera J, Virtanen M. School environment as predictor of teacher sick leave: data-linked prospective cohort study. BMC Public Health. 2012 Sep 11;12:770. http://dx.doi.org/10.1186/1471-2458-12-770.

Chia SE, Wong KY, Tai BC. Occupation and risk of non-Hodgkin's lymphoma in Singapore. Occup Med (Lond). 2012 Jan;62(1):29-33. http://dx.doi.org/10.1093/occmed/kqr188.

Tak S, Groenewold M, Alterman T, Park RM, Calvert GM. Excess risk of head and chest colds among teachers and other school workers. J Sch Health. 2011 Sep;81(9):560-5. http://dx.doi.org/10.1111/j.1746-1561.2011.00627.x.

Suarthana E, McFadden JD, Laney AS, Kreiss K, Anderson HA, Hunt DC, Neises D, Goodin K, Thomas A, Vandermeer M, Storey E. Occupational distribution of persons with confirmed 2009 H1N1 influenza. J Occup Environ Med. 2010 Dec;52(12):1212-6. http://dx.doi.org/10.1097/JOM.0b013e3181fd32e4.

Obadia M, Liss GM, Lou W, Purdham J, Tarlo SM. Relationships between asthma and work exposures among non-domestic cleaners in Ontario. Am J Ind Med. 2009 Sep;52(9):716-23. http://dx.doi.org/10.1002/ajim.20730.

BLS. Occupational Injuries and Illnesses (Annual) News Release, OS NR 10/29/2009 News Release: Workplace injuries and illnesses—2008. http://www.bls.gov/news.release/archives/osh_10292009.htm. Accessed Jun 3, 2013

Davis LK, Phillip Hunt P, Pechter E, Baldwin M. Assessing Work-related Respiratory Problems among Massachusetts Elementary School Staff: Results of a Pilot Survey. Massachusetts Department of Public Health, Boston, 2007. http://170.63.28.40/eohhs/docs/dph/occupational-health/school-staff-respiratory-health.pdf. Accessed July 26, 2013

Mazurek JM, Filios M, Willis R, Rosenman KD, Reilly MJ, McGreevy K, Schill DP, Valiante D, Pechter E, Davis L, Flattery J, Harrison R. Work-related asthma in the educational services industry: California, Massachusetts, Michigan, and New Jersey, 1993-2000. Am J Ind Med. 2008 Jan;51(1):47-59. http://dx.doi.org/10.1002/ajim.20539.

Boffetta P, de Vocht F. Occupation and the risk of non-Hodgkin lymphoma. Cancer Epidemiol Biomarkers Prev. 2007 Mar;16(3):369-72. http://dx.doi.org/10.1158/1055-9965.EPI-06-1055.

Intermediate Goal 4.4: Create guidance documents for hazard identification and control and indoor air quality in public and private schools by 2015.

Research Goal 4.4.1: By 2015, characterize chemical, biological and physical hazards in school environments such as science laboratories, art studios, music rooms, hallways, classrooms, offices, sport arenas, transportation facilities, cafeterias and traffic and parking areas. Focus on special education and technical programs, such as auto and HVAC shops.

Accomplished – **Translation Goal 4.4.2:** By 2012, develop protocols for chemical, biological, and physical hazard assessment in education facilities that may be used with minimal training by school staff.

Environmental and Occupational Health Sciences Institute. Safe Schools Manual. New Jersey Department of Education, Office of Career and Technical Education, 1992 with semi-annual updates. http://www.state.nj.us/education/schools/safeschools/. Accessed July 26, 2013

The Commission on Health and Safety and Workers' Compensation. School Action for Safety and Health. 2010. http://www.dir.ca.gov/chswc/SASH/Publications/SASH_Binder.pdf. Accessed July 26, 2013

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Hannu T, Riihimäki V, Piirilä P. Reactive airway dysfunction syndrome (RADS) in a chemistry teacher induced by fumes of mixed iodine compounds. Ind Health. 2009 Dec;47(6):681-4. http://www.ncbi.nlm.nih.gov/pubmed/19996546.

Accomplished – **Translation Goal 4.4.3:** By 2013, characterize the school building environment, develop best practices for building architecture and construction, and support wide utilization of these practices for new facilities and renovation of existing facilities. (For example, identify the best type of ventilation for teaching workshops or the best designed classrooms for students with special needs that promote learning while protecting worker health.)

ASHRAE. Ventilation for Acceptable Indoor Air Quality. Atlanta, GA; 2010. http://openpub.realread.com/rrserver/browser?title=/ASHRAE_1/ashrae_62_1_2010_1024. Accessed June 5, 2013

USEPA. IAQ Design Tools for Schools: Heating, Ventilation and Air-Conditioning (HVAC) Systems. http://www.epa.gov/iaq/schooldesign/hvac.html. Accessed June 5, 2013

Accomplished – **Dissemination Goal 4.4.4:** By 2014, deliver best practice guidelines for school construction and renovations through collaboration with the American Institute of Architects and the Sheet Metal and Air Conditioning Contractors' National Association.

The Sheet Metal and Air Conditioning Contractor's National Association (SMACNA). IAQ Guidelines for Occupied Buildings under Construction, 2nd ed. 2007. www.smacna.org. (Available for purchase) Accessed July 26, 2013

Research Goal 4.4.5: By 2015, characterize the organization of work including stressors such as communication methods, violence, and lack of job control and define the essential elements of a healthy school work environment.

Tiesman H, Konda S, Hendricks S, Mercer D, Amandus H. Workplace violence among Pennsylvania education workers: differences among occupations. J Safety Res. 2013 Feb;44:65-71. http://dx.doi.org/10.1016/j.jsr.2012.09.006.

Wei C, Gerberich SG, Alexander BH, Ryan AD, Nachreiner NM, Mongin SJ. Work-related violence against educators in Minnesota: rates and risks based on hours exposed. J Safety Res. 2013 Feb;44:73-85. http://dx.doi.org/10.1016/j.jsr.2012.12.005.

Nachreiner NM, Gerberich SG, Ryan AD, Erkal S, McGovern PM, Church TR, Mongin SJ, Feda DM. Risk of physical assault against school educators with histories of occupational and other violence: a case-control study. Work. 2012;42(1):39-46. http://dx.doi.org/10.3233/WOR-2012-1331.

Sampaio MC, dos Reis EJ, Carvalho FM, Porto LA, Araújo TM. Vocal effort and voice handicap among teachers. J Voice. 2012 Nov;26(6):820.e15-8. http://dx.doi.org/10.1016/j.jvoice.2012.06.003.

Ohlsson AC, Andersson EM, Södersten M, Simberg S, Barregård L. Prevalence of voice symptoms and risk factors in teacher students. J Voice. 2012 Sep;26(5):629-34. http://dx.doi.org/10.1016/j.jvoice.2011.11.002.

Zimmermann L, Unterbrink T, Pfeifer R, Wirsching M, Rose U, Stößel U, Nübling M, Buhl-Grießhaber V, Frommhold M, Schaarschmidt U, Bauer J. Mental health and patterns of work-related coping behaviour in a German sample of student teachers: a cross-sectional

study. Int Arch Occup Environ Health. 2012 Nov;85(8):865-76. http://dx.doi.org/10.1007/s00420-011-0731-7.

Ervasti J, Kivimäki M, Pentti J, Salmi V, Suominen S, Vahtera J, Virtanen M. Work-related violence, lifestyle, and health among special education teachers working in Finnish basic education. J Sch Health. 2012 Jul;82(7):336-43. http://dx.doi.org/10.1111/j.1746-1561.2012.00707.x.

Da Costa V, Prada E, Roberts A, Cohen S. Voice disorders in primary school teachers and barriers to care. J Voice. 2012 Jan;26(1):69-76. http://dx.doi.org/10.1016/j.jvoice.2010.09.001.

Gaskill CS, O'Brien SG, Tinter SR. The effect of voice amplification on occupational vocal dose in elementary school teachers. J Voice. 2012 Sep;26(5):667.e19-27. http://dx.doi.org/10.1016/j.jvoice.2011.10.010.

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Seibt R, Matz A, Hegewald J, Spitzer S. Working conditions of female part-time and full-time teachers in relation to health status. Int Arch Occup Environ Health. 2012 Aug;85(6):675-87. http://dx.doi.org/10.1007/s00420-011-0715-7.

Timmermans B, Coveliers Y, Wuyts FL, Van Looy L. Voice training in teacher education: the effect of adding an individualized microteaching session of 30 minutes to the regular 6-hour voice training program. J Voice. 2012 Sep;26(5):669.e1-9. http://dx.doi.org/10.1016/j.jvoice.2011.03.001.

Wegner R, Berger P, Poschadel B, Manuwald U, Baur X. Burnout hazard in teachers results of a clinical-psychological intervention study. J Occup Med Toxicol. 2011 Dec 22;6(1):37. http://dx.doi.org/10.1186/1745-6673-6-37.

Souza CL, Carvalho FM, Araújo TM, Reis EJ, Lima VM, Porto LA. Factors associated with vocal fold pathologies in teachers. Rev Saude Publica. 2011 Oct;45(5):914-21. English, Portuguese. http://www.ncbi.nlm.nih.gov/pubmed/21829977.

Van Houtte E, Claeys S, Wuyts F, Van Lierde K. The impact of voice disorders among teachers: vocal complaints, treatment-seeking behavior, knowledge of vocal care, and voice-related absenteeism. J Voice. 2011 Sep;25(5):570-5. http://dx.doi.org/10.1016/j.jvoice.2010.04.008.

Gerberich, S. G., Nachreiner, N. N., Ryan, A. D., Church, T. R., McGovern, P. M., Geisser, M. S., et al. Violence against educators: a population-based study. J Occup Environ Med. 2011 Mar;53(3):294–302. http://dx.doi.org/10.1097/JOM.0b013e31820c3fa1.

Sun W, Wu H, Wang L. Occupational stress and its related factors among university teachers in China. J Occup Health. 2011;53(4):280-6. http://www.ncbi.nlm.nih.gov/pubmed/21691036.

Yang X, Wang L, Ge C, Hu B, Chi T. Factors associated with occupational strain among Chinese teachers: a cross-sectional study. Public Health. 2011 Feb;125(2):106-13. http://dx.doi.org/10.1016/j.puhe.2010.10.012.

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Verdonk P, Hooftman WE, van Veldhoven MJ, Boelens LR, Koppes LL. Work-related fatigue: the specific case of highly educated women in the Netherlands. Int Arch Occup Environ Health. 2010 Mar;83(3):309-21. http://dx.doi.org/10.1007/s00420-009-0481-y.

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Casteel C, Peek-Asa C, Limbos MA. Predictors of nonfatal assault injury to public school teachers in Los Angeles City. Am J Ind Med. 2007 Dec;50(12):932-9. http://dx.doi.org/10.1002/ajim.20520.

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Chiu TT, Lam PK. The prevalence of and risk factors for neck pain and upper limb pain among secondary school teachers in Hong Kong. J Occup Rehabil. 2007 Mar;17(1):19-32. http://www.ncbi.nlm.nih.gov/pubmed/16933144.

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Rose L, Westinghouse C. Cleaning for Healthier Schools – Infection Control Handbook. National Cleaning for Healthier Schools and Infection Control Workgroup. 2010. http://www.cdph.ca.gov/programs/ohsep/Documents/CleanSchoolsHandbook.pdf. Accessed July 26, 2013

Dissemination Goal 4.5.2: By 2014, disseminate best practice guidelines for occupational health and safety programs in public and private education systems.

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Occupational Safety and Health Administration. FY2011 Developmental Follow-on Susan Harwood Grant to American Federation of Teachers Educational Foundation, Washington, DC, $187,000. The grantee will expand the capacity of its safety and health program to prevent work-related illnesses and injuries among school and university employees, and health care workers. Topics will include workplace violence, ergonomics and walking and

working surfaces. https://www.osha.gov/dte/sharwood/2011_grant_recipients.html. Accessed July 29, 2013

Occupational Safety and Health Administration. FY2011 Developmental Follow-on Susan Harwood Grant to American Federation of Teachers Educational Foundation, Washington, DC, $181,390. The grantee will provide basic hazard awareness training to workers and administrators in multiple states. The grantee will expand its health and safety trainer network, facilitate the building of effective health and safety committees, and provide technical support and training.
https://www.osha.gov/dte/sharwood/2012_grant_recipients.html. Accessed July 29, 2013

HOTELS AND MOTELS

> **Research Goal 6.1.1:** By 2015, conduct exposure assessment and recommend substitutions and/or controls, as needed, for agents such as cleaning compounds, pesticides, environmental tobacco smoke, heat and the allied tasks, operations, and work conditions or organizations that may be associated with worker skin disorders, respiratory disease or stress-related disorders.

Silva JS Jr, Correa LR, Morrone LC. Evaluation of lumbar overload in hotel maids. Work. 2012;41 Suppl 1:2496-8. http://dx.doi.org/10.3233/WOR-2012-0488-2496.

Bell AF, Steele JR. Risk of musculoskeletal injury among cleaners during vacuuming. Ergonomics. 2012;55(2):237-47. http://dx.doi.org/10.1080/00140139.2011.592605.

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http://dx.doi.org/10.1002/ajim.20832.

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Muraca G, Martino LB, Abbate A, De Pasquale D, Barbuzza O, Brecciaroli R. [The risk of manual handling loads in the hotel sector]. G Ital Med Lav Ergon. 2007 Jul-Sep;29(3 Suppl):569-70. Italian. http://www.ncbi.nlm.nih.gov/pubmed/18409837.

Intermediate Goal 7.1: Develop training materials for supervisors and workers that address environmental, organizational, and behavioral factors associated with health disparities, if any are found to exist, among hotel and motel workers.

Research Goal 7.1.1: By 2015, complete etiologic studies among hotel and motel workers to characterize exposures and behavioral, organizational, and economic factors that may be related to health disparities.

Nyberg A, Holmberg I, Bernin P, Alderling M, Åkerblom S, Widerszal-Bazyl M, Magrin ME, Hasselhorn HM, Milczarek M, D'Angelo G, Denk M, Westerlund H, Theorell T. Destructive managerial leadership and psychological well-being among employees in Swedish, Polish, and Italian hotels. Work. 2011;39(3):267-81. http://dx.doi.org/10.3233/WOR-2011-1175.

Premji S, Krause N. Disparities by ethnicity, language, and immigrant status in occupational health experiences among Las Vegas hotel room cleaners. Am J Ind Med. 2010 Oct;53(10):960-75. http://dx.doi.org/10.1002/ajim.20860.

Buchanan S, Vossenas P, Krause N, Moriarty J, Frumin E, Shimek JA, Mirer F, Orris P, Punnett L. Occupational injury disparities in the US hotel industry. Am J Ind Med. 2010 Feb;53(2):116-25. http://dx.doi.org/10.1002/ajim.20724.

Nigg CR, Albright C, Williams R, Nichols C, Renda G, Stevens VJ, Vogt TM. Are physical activity and nutrition indicators of the checklist of health promotion environments at worksites (CHEW) associated with employee obesity among hotel workers? J Occup Environ Med. 2010 Jan;52 Suppl 1:S4-7. http://dx.doi.org/10.1097/JOM.0b013e3181c78a3a.

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Rugulies R, Scherzer T, Krause N. Associations between psychological demands, decision latitude, and job strain with smoking in female hotel room cleaners in Las Vegas. Int J Behav Med. 2008 Jan-Mar;15(1):34-43. http://dx.doi.org/10.1007/BF03003072.

Occupational Safety and Health Administration. FY2012 Developmental Follow-on Susan Harwood Grant to Regents of the University of California at Los Angeles, Los Angeles, CA, $181,390. The grantee will offer culturally and language appropriate training to low wage immigrant workers in the hotel, car wash and waste industries. Training and materials will target the large Southern California Spanish-speaking workforce. Classes will provide training on topics such as hazard identification, chemical hazards, ergonomics, worker rights, and effective health and safety committees. https://www.osha.gov/dte/sharwood/2012_grant_recipients.html. Accessed July 29, 2013

PUBLIC ADMINISTRATION (Except Public Safety)

Accomplished – **Surveillance Goal 8.1**: Ensure that health and safety surveillance systems are developed, implemented, and utilized to identify and track risks for illnesses and injuries among government employees.

BLS. Occupational Injuries and Illnesses (Annual) News Release, OS NR 10/29/2009 News Release: Workplace injuries and illnesses—2008. http://www.bls.gov/news.release/archives/osh_10292009.htm. Accessed Jun 3, 2013

RECREATION AND ENTERTAINMENT

Accomplished – **Surveillance Goal 9.1**: Identify and analyze sources of information that may be used to develop estimates of traumatic injury rates for workers in the recreation and entertainment industries. Estimate the risk of injury for youth, immigrant, and temporary workers in the recreation and entertainment industry.

Information circulated in an industry-specific newsletter by Dr. Gil Fried, University of New Haven and described in NIOSH *eNews*: http://www.cdc.gov/niosh/enews/enewsV8N4.html#nora.

Intermediate Goal 9.2: Develop and promote best practice guidelines to prevent injuries from over exertion, adverse bodily reaction, falls, and contact with equipment and objects in the recreation and entertainment industry.

Oughton N. Managing occupational risk in creative practice: a new perspective for occupational health and safety. Arch Environ Occup Health. 2013;68(1):47-54. http://dx.doi.org/10.1080/19338244.2011.639818.

Hamilton GM, Meeuwisse WH, Emery CA, Shrier I. Examining the effect of the injury definition on risk factor analysis in circus artists. Scand J Med Sci Sports. 2012 Jun;22(3):330-4. http://dx.doi.org/10.1111/j.1600-0838.2010.01245.x.

Wanke EM, McCormack M, Koch F, Wanke A, Groneberg DA. Acute injuries in student circus artists with regard to gender specific differences. Asian J Sports Med. 2012 Sep;3(3):153-60. https://www.pubmedcentral.nih.gov/pmc/articles/PMC3445642/. Accessed July 26, 2013

Paarup HM, Baelum J, Manniche C, Holm JW, Wedderkopp N. Occurrence and co-existence of localized musculoskeletal symptoms and findings in work-attending orchestra musicians - an exploratory cross-sectional study. BMC Res Notes. 2012 Oct 1;5:541. http://dx.doi.org/10.1186/1756-0500-5-541.

Wanke EM, Groneberg DA, Quarcoo D. [Analysis and evaluation of acute injuries in musical performers]. Sportverletz Sportschaden. 2011 Sep;25(3):179-83. German. http://dx.doi.org/10.1055/s-0029-1245911.

Papandreou M, Vervainioti A. Work-related musculoskeletal disorders among percussionists in Greece: a pilot study. Med Probl Perform Art. 2010 Sep;25(3):116-9. http://www.ncbi.nlm.nih.gov/pubmed/21120269.

Woodcock K. Content analysis of 100 consecutive media reports of amusement ride accidents. Accid Anal Prev. 2008 Jan;40(1):89-96. http://dx.doi.org/10.1016/j.aap.2007.04.007.

Accomplished – **Intermediate Goal 9.3:** Develop and promote guidelines to reduce exposures to hazardous agents associated with internal combustion engines and other sources in the recreation and entertainment industry.

Accomplished – **Research Goal 9.3.1**: By 2012, identify effective interventions to reduce exposures to engine exhaust from performance vehicles and maintenance equipment that are operated indoors.

Accomplished – **Research Goal 9.3.2**: By 2013, evaluate noise exposures for workers in the recreation and entertainment industry and develop guidelines for control of excessive noise exposures.

Cranston CJ, Brazile WJ, Sandfort DR, Gotshall RW. Occupational and recreational noise exposure from indoor arena hockey games. J Occup Environ Hyg. 2013;10(1):11-6. http://dx.doi.org/10.1080/15459624.2012.736341.

Flamme GA, Williams N. Sports officials' hearing status: whistle use as a factor contributing to hearing trouble. J Occup Environ Hyg. 2013;10(1):1-10. http://dx.doi.org/10.1080/15459624.2012.736340.

ASHRAE. Ventilation for Acceptable Indoor Air Quality. Atlanta, GA; 2010. http://openpub.realread.com/rrserver/browser?title=/ASHRAE_1/ashrae_62_1_2010_1024. Accessed on June 5, 2013

Centers for Disease Control and Prevention (CDC). Exposure to nitrogen dioxide in an indoor ice arena - New Hampshire, 2011. MMWR Morb Mortal Wkly Rep. 2012 Mar 2;61(8):139-42. http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6108a2.htm. Accessed July 26, 2013

Kim T, Wagner J. PM2.5 and CO concentrations inside an indoor go-kart facility. J Occup Environ Hyg. 2010 Jul;7(7):397-406. http://dx.doi.org/10.1080/15459621003791628.

Salonen RO, Pennanen AS, Vahteristo M, Korkeila P, Alm S, Randell JT. Health risk assessment of indoor air pollution in Finnish ice arenas. Environ Int. 2008 Jan;34(1):51-7. http://dx.doi.org/10.1016/j.envint.2007.06.012.

Other Recreation and Entertainment Research – Not Goal Related

Jezewska A, Szewczyńska M. [Chemical hazards in the workplace environment of painting restorer]. Med Pr. 2012;63(5):547-58. Polish. http://www.ncbi.nlm.nih.gov/pubmed/23373323.

Gribovich A, Lacey S, Franke J, Hinkamp D. Assessment of arsenic surface contamination in a museum anthropology department. J Occup Environ Med. 2013 Feb;55(2):164-7. http://dx.doi.org/10.1097/JOM.0b013e3182717e51.

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and other public buildings. Environ Geochem Health. 2013 Jun;35(3):333-40. http://dx.doi.org/10.1007/s10653-012-9497-4.

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Janev Holcer N, Pucarin-Cvetković J, Mustajbegović J, Zuškin E. [Dance as a risk factor for injuries and development of occupational diseases]. Arh Hig Rada Toksikol. 2012 Jun 1;63(2):239-46. Review. Croatian. http://dx.doi.org/10.2478/10004-1254-63-2012-2170.

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Bové MJ, Kansal S, Rosen CA. Influenza and the vocal performer: update on prevention and treatment. J Voice. 2008 May;22(3):326-32. Review. http://dx.doi.org/10.1016/j.jvoice.2006.09.012.

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RESTAURANTS AND FOOD SERVICES

Accomplished – **Surveillance Goal 10.1:** Identify sources of information that can be used to estimate the frequency of injuries to populations of youth, immigrant and disabled workers in the food service industry.

Utterback DF, Charles LE, Schnorr TM, Tiesman HM, Storey E, Vossenas P. Occupational Injuries, Illnesses and Fatalities among Workers in the Services Sector Industries: 2003 – 2007. Am J Ind Med. 2012;54:31–41. http://dx.doi.org/10.1097/JOM.0b013e3182398e36.

Intermediate Goal 10.3: Promote the development of comprehensive occupational safety and health programs for restaurants and other food service establishments.

Accomplished – **Research Goal 10.3.1:** By 2011, complete benchmarks of comprehensive occupational safety and health programs for small business food service establishments and identify best practices that lead to reduced frequencies of injuries, with particular attention paid to youth, immigrant and disabled worker training methods.

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Occupational Safety and Health Administration. FY2012 Developmental Follow-on Susan Harwood Grant to Regents of the University of California at Berkeley, Berkeley, CA, $181,330. The grantee will conduct training that addresses a variety of safety and health hazards facing hard-to-reach workers, immigrants, and young workers concentrated in the restaurant, nail salon, and recycling industries. Training will take place in California. Training and materials will be available in English and Spanish. A select number of materials will be available in Chinese. https://www.osha.gov/dte/sharwood/2012_grant_recipients.html. Accessed July 29, 2013

Occupational Safety and Health Administration. FY2012 Developmental Follow-on Susan Harwood Grant to Interfaith Worker Justice, Chicago, IL, $181,388. The grantee will provide worker and train-the-trainer training that addresses specific health and safety hazards in construction, cleaning service, poultry/meat packing, restaurants, landscaping, and home care. Training will target non-English speaking/limited English proficiency workers, non-literate and low literacy workers, young workers, and hard-to-reach workers. Training and materials will be available in English and Spanish. https://www.osha.gov/dte/sharwood/2012_grant_recipients.html. Accessed July 29, 2013

Occupational Safety and Health Administration. FY2012 Developmental Follow-on Susan Harwood Grant to Georgia Tech Applied Research Corporation, Atlanta, GA, $181,350. The grantee will provide training on workplace hazards targeting young workers and employers of young workers specifically in the healthcare, cosmetology, culinary and construction industries. Training will be focused in the South and Southeast including Texas, Louisiana, South Carolina, North Carolina, Tennessee and Kentucky. https://www.osha.gov/dte/sharwood/2012_grant_recipients.html. Accessed July 29, 2013

Occupational Safety and Health Administration. FY2011 Developmental Follow-on Susan Harwood Grant to Regents of the University of California - Berkeley, Berkeley, CA, $187,000. The grantee will provide training to low-income, immigrant and youth workers employed in small businesses in Northern California. The target audiences are workers in nail salons, restaurants, janitorial services, residential care, and landscaping services. The training and/or materials will be offered in English, Vietnamese, and Spanish. https://www.osha.gov/dte/sharwood/2011_grant_recipients.html. Accessed July 29, 2013

Occupational Safety and Health Administration. FY2012 Developmental Follow-on Susan Harwood Grant to Regents of the University of California at Los Angeles, Los Angeles, CA, $181,390. The grantee will offer culturally and language appropriate training to low wage immigrant workers in the hotel, car wash and waste industries. Training and materials will

target the large Southern California Spanish-speaking workforce. Classes will provide training on topics such as hazard identification, chemical hazards, ergonomics, worker rights, and effective health and safety committees.
https://www.osha.gov/dte/sharwood/2012_grant_recipients.html. Accessed July 29, 2013

Occupational Safety and Health Administration. FY2011 Developmental Follow-on Susan Harwood Grant to National Council for Occupational Safety and Health, Raleigh, NC, $663,000. The grantee will conduct training that targets high-risk vulnerable workers, especially those with limited English proficiency. Training will be provided by participating COSH groups. Training will include classes on hazards associated with maintenance, housekeeping, custodial, agricultural, and restaurant work. The training and/or materials will be offered in English and Spanish.
https://www.osha.gov/dte/sharwood/2011_grant_recipients.html. Accessed July 29, 2013

Occupational Safety and Health Administration. FY2011 Developmental Follow-on Susan Harwood Grant to Interfaith Worker Justice, Chicago, IL, $186,998. The grantee will develop and provide safety training that targets low-wage, immigrant workers in construction, landscaping, poultry/meatpacking, restaurants, and cleaning services. The employer training will include how to develop or improve a safety and health program. The training and/or materials will be offered in English, Spanish and Polish.
https://www.osha.gov/dte/sharwood/2011_grant_recipients.html. Accessed July 29, 2013

Occupational Safety and Health Administration. 2010 Pilot Susan Harwood Grant to Make the Road New York Inc., Brooklyn, NY, $85,000. The grantee will conduct a needs assessment to identify workplace hazards in small businesses located in New York City. Training will be developed for Latino immigrant workers and employers engaged in low-wage industries including restaurants, manufacturing, commercial laundry, and garment. The plan calls for integrating the safety materials into ESOL and job skills training classes.
https://www.osha.gov/dte/sharwood/2010_grant_recipients.html. Accessed July 28, 2013

Occupational Safety and Health Administration. 2010 Pilot Susan Harwood Grant to Center for Human Services, Bethesda, MD, $85,000. The grantee will develop a training program targeting immigrant and low literacy Hispanic/Latino workers in Pennsylvania's food service industry. Training materials will be modified for low literacy and second language learners. Training will include OSHA, worker rights and reducing workplace injuries. The training and/or materials will be offered in English and Spanish.
https://www.osha.gov/dte/sharwood/2010_grant_recipients.html. Accessed July 29, 2013

Occupational Safety and Health Administration. 2009 Susan Harwood Grant to Restaurant Opportunities Centers United, New York, NY, $275,000. Restaurant Opportunities Centers United plans to provide training to small restaurant employers in various locations including Chicago, New York, Detroit, Los Angeles, Miami, and Washington, DC. The proposed work plan includes conducting train-the-trainer curriculum in multiple languages, a peer education program, and an employer education program as well as developing local health and safety committees for ongoing workers and employer education. It is projected that 50 small restaurant employers and 2,000 restaurant workers will receive training addressing ergonomic guidelines for the restaurant industry.
https://www.osha.gov/dte/sharwood/2009_grant_recipients.html. Accessed July 29, 2013

Accomplished – **Translation Goal 10.3.6:** by 2010, develop and disseminate effective disaster response plans for food service and drinking establishments.

Luckhaupt SE, Sweeney MH, Funk R, Calvert GM, Nowell M, D'Mello T, Reingold A, Meek J, Yousey-Hindes K, Arnold KE, Ryan P, Lynfield R, Morin C, Baumbach J, Zansky S, Bennett NM, Thomas A, Schaffner W, Jones T. Influenza-associated hospitalizations by industry, 2009-10 influenza season, United States. Emerg Infect Dis. 2012 Apr;18(4):556-62. http://dx.doi.org/10.3201/eid1804.110337.

New England Culinary Institute. Emergency Response, Evacuation Procedures and Recovery Plan. Revised June 26, 2012. http://www.neci.edu/about/disclosure-info/emergency-response. Accessed May 31, 2013

Florida Restaurant and Lodging Association. Emergency and Disaster Preparedness. http://www.frla.org/tools-and-solutions/emergency-a-disaster-preparedness. Accessed May 31, 2013

Michigan Department of Agriculture and Rural Development. Emergency Action Plans for Retail Food Establishments. http://www.michigan.gov/mdard/0,4610,7-125-1568-105442--,00.html. Accessed May 31, 2013

Intermediate Goal 11.1: Create and promote acceptable and effective violence prevention strategies for restaurants and for food delivery services.

Research Goal 11.1.1: By 2015, evaluate barriers to the adoption of violence prevention strategies by restaurants and develop alternative interventions to overcome the barriers.

Pridemore WA, Grubesic TH. Community organization moderates the effect of alcohol outlet density on violence. Br J Sociol. 2012 Dec;63(4):680-703. http://dx.doi.org/10.1111/j.1468-4446.2012.01432.x.

Mair C, Gruenewald PJ, Ponicki WR, Remer L. Varying impacts of alcohol outlet densities on violent assaults: explaining differences across neighborhoods. J Stud Alcohol Drugs. 2013 Jan;74(1):50-8. http://www.ncbi.nlm.nih.gov/pubmed/23200150.

Casteel C, Peek-Asa C, Greenland S, Chu LD, Kraus JF. A study of the effectiveness of a workplace violence intervention for small retail and service establishments. J Occup Environ Med. 2008 Dec;50(12):1365-70. http://dx.doi.org/10.1097/JOM.0b013e3181845fcf.

Other Food Services Research – Not Goal Related

Kelly AC, Boyd SM, Henehan GT, Chambers G. Occupational noise exposure of nightclub bar employees in Ireland. Noise Health. 2012 Jul-Aug;14(59):148-54. http://www.ncbi.nlm.nih.gov/pubmed/22918144.

Barlow C, Castilla-Sanchez F. Occupational noise exposure and regulatory adherence in music venues in the United Kingdom. Noise Health. 2012 Mar-Apr;14(57):86-90. http://dx.doi.org/10.4103/1463-1741.95137.

Vester L, Thyssen JP, Menné T, Johansen JD. Consequences of occupational food-related hand dermatoses with a focus on protein contact dermatitis. Contact Dermatitis. 2012 Dec;67(6):328-33. http://dx.doi.org/10.1111/j.1600-0536.2012.02101.x.

Reijula JP, Johnsson TS, Kaleva PS, Reijula KE. Exposure to tobacco smoke and prevalence of symptoms decreased among Finnish restaurant workers after the smoke-free law. Am J Ind Med. 2012 Jan;55(1):37-43. http://dx.doi.org/10.1002/ajim.21006.

Davila EP, Florez H, Fleming LE, Lee DJ, Goodman E, LeBlanc WG, Caban-Martinez AJ, Arheart KL, McCollister KE, Christ SL, Clark JC 3rd, Clarke T. Prevalence of the metabolic syndrome among U.S. workers. Diabetes Care. 2010 Nov;33(11):2390-5. http://dx.doi.org/10.2337/dc10-0681.

Wilson MD, McGlothlin JD, Rosenthal FS, Black DR, Zimmerman NJ, Bridges CD. Ergonomics. The effect of occupational exposure to environmental tobacco smoke on the heart rate variability of bar and restaurant workers. J Occup Environ Hyg. 2010 Jul;7(7):D44-9. http://dx.doi.org/10.1080/15459624.2010.483980.

Sjaastad AK, Jørgensen RB, Svendsen K. Exposure to polycyclic aromatic hydrocarbons (PAHs), mutagenic aldehydes and particulate matter during pan frying of beefsteak. Occup Environ Med. 2010 Apr;67(4):228-32. http://dx.doi.org/10.1136/oem.2009.046144.

Hall JC, Bernert JT, Hall DB, St Helen G, Kudon LH, Naeher LP. Assessment of exposure to secondhand smoke at outdoor bars and family restaurants in Athens, Georgia, using salivary cotinine. J Occup Environ Hyg. 2009 Nov;6(11):698-704. http://dx.doi.org/10.1080/15459620903249893.

Klein EG, Forster JL, Erickson DJ, Lytle LA, Schillo B. Does the type of CIA policy significantly affect bar and restaurant employment in Minnesota cities? Prev Sci. 2009 Jun;10(2):168-74. http://dx.doi.org/10.1007/s11121-009-0122-4.

Stanbury M, Chester D, Hanna EA, Rosenman KD. How many deaths will it take? A death from asthma associated with work-related environmental tobacco smoke. Am J Ind Med. 2008 Feb;51(2):111-6. http://dx.doi.org/10.1002/ajim.20538.

Okoli CT, Hall LA, Rayens MK, Hahn EJ. Measuring tobacco smoke exposure among smoking and nonsmoking bar and restaurant workers. Biol Res Nurs. 2007 Jul;9(1):81-9. http://dx.doi.org/10.1177/1099800407300852.

Stark MJ, Rohde K, Maher JE, Pizacani BA, Dent CW, Bard R, Carmella SG, Benoit AR, Thomson NM, Hecht SS. The impact of clean indoor air exemptions and preemption policies on the prevalence of a tobacco-specific lung carcinogen among nonsmoking bar and restaurant workers. Am J Public Health. 2007 Aug;97(8):1457-63. http://dx.doi.org/10.2105/AJPH.2006.094086.

Milz S, Akbar-Khanzadeh F, Ames A, Spino S, Tex C, Lanza K. Indoor air quality in restaurants with and without designated smoking rooms. J Occup Environ Hyg. 2007 Apr;4(4):246-52. http://dx.doi.org/10.1080/15459620701204801.

Okoli CT, Rayens MK, Hahn EJ. Behavioral effects of nicotine exposure from secondhand tobacco smoke among bar and restaurant workers. Addict Behav. 2007 Sep;32(9):1922-8. http://dx.doi.org/10.1016/j.addbeh.2006.12.013.

TELECOMMUNICATIONS

Intermediate Goal 12.1: Develop and promote guidelines for reducing illnesses and injuries in the telecommunications industry that are associated with work organization factors, physical hazards associated with musculoskeletal disorders, shift work, work load, work pace, training, and indoor air quality.

Kirk E, Strong J, Burgess-Limerick R. Developing computer competencies for eWorkers within call centres. Work. 2013 Jan 2. Early online. http://www.ncbi.nlm.nih.gov/pubmed/23324699.

Wagner KC, Yates D, Walcott Q. Engaging men and women as allies: a workplace curriculum module to challenge gender norms about domestic violence, male bullying and workplace violence and encourage ally behavior. Work. 2012;42(1):107-13. http://dx.doi.org/10.3233/WOR-2012-1334.

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Conway PM, Aquilina T, Campanini P, Camerino D, Punzi S, Fichera GP, Francioli L, Neri L, Costa G. [Assessing employees' perceptions of risk factors for job stress using context-specific methods: the case of call-center workers]. G Ital Med Lav Ergon. 2011 Jul-Sep;33(3 Suppl):343-7. Italian. http://www.ncbi.nlm.nih.gov/pubmed/23393872.

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Lacaze DH, Sacco Ide C, Rocha LE, Pereira CA, Casarotto RA. Stretching and joint mobilization exercises reduce call-center operators' musculoskeletal discomfort and fatigue. Clinics (Sao Paulo). 2010 Jul;65(7):657-62. http://dx.doi.org/10.1590/S1807-59322010000700003.

Lin YH, Chen CY, Hong WH, Lin YC. Perceived job stress and health complaints at a bank call center: comparison between inbound and outbound services. Ind Health. 2010;48(3):349-56. http://dx.doi.org/10.2486/indhealth.48.349.

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d'Errico A, Caputo P, Falcone U, Fubini L, Gilardi L, Mamo C, Migliardi A, Quarta D, Coffano E. Risk factors for upper extremity musculoskeletal symptoms among call center employees. J Occup Health. 2010;52(2):115-24. http://dx.doi.org/10.1539/joh.L9117.

Krause N, Burgel B, Rempel D. Effort-reward imbalance and one-year change in neck-shoulder and upper extremity pain among call center computer operators. Scand J Work Environ Health. 2010 Jan;36(1):42-53. http://dx.doi.org/10.5271/sjweh.2881.

Charbotel B, Croidieu S, Vohito M, Guerin AC, Renaud L, Jaussaud J, Bourboul C, Imbard I, Ardiet D, Bergeret A. Working conditions in call-centers, the impact on employee health: a transversal study. Part II. Int Arch Occup Environ Health. 2009 May;82(6):747-56. http://dx.doi.org/10.1007/s00420-008-0351-z.

Croidieu S, Charbotel B, Vohito M, Renaud L, Jaussaud J, Bourboul C, Ardiet D, Imbard I, Guerin AC, Bergeret A. Call-handlers' working conditions and their subjective experience of work: a transversal study. Int Arch Occup Environ Health. 2008 Oct;82(1):67-77. http://dx.doi.org/10.1007/s00420-008-0308-2.

Scarone M, Cedillo LA. Psychosocial risk factors among telephone service workers: a study of the interaction between customer and worker. New Solut. 2007;17(1-2):137-50. http://www.ncbi.nlm.nih.gov/pubmed/17434865.

Accomplished – Research Goal 12.1.8**:** By 2012, determine the relationships between environmental conditions that are associated with good indoor air quality and the operational characteristics of building systems that control temperature, humidity and atmospheric gases and particulate for various building types.

ASHRAE. Ventilation for Acceptable Indoor Air Quality. Atlanta, GA; 2010. http://openpub.realread.com/rrserver/browser?title=/ASHRAE_1/ashrae_62_1_2010_1024. Accessed June 5, 2013

Federspiel CC, Fisk WJ, Price PN, Liu G, Faulkner D, Dibartolomeo DL, Sullivan DP, Lahiff M. Worker performance and ventilation in a call center: analyses of work performance data for registered nurses. Indoor Air. 2004;14 Suppl 8:41-50. http://dx.doi.org/10.1111/j.1600-0668.2004.00299.x.

Intermediate Goal 13.1: Identify and prevent occupational fatalities in the telecommunications industries and develop evidence based recommendations and best practices guidelines.

Research Goal 13.1.1: By 2015, identify causal factors for and implement interventions to reduce falls from elevation, contact with electric power and vehicle and equipment incidents.

Michigan State University. MIFACE Case 264. 46-year-old male data technician/field operations supervisor/safety officer for a telecommunications company was electrocuted when he contacted 277 volts of electricity while relocating television monitors and associated cabling. Undated. http://www.oem.msu.edu/MIFACE_Constr_Div/Case264.pdf. Accessed June 6, 2013

Washington State Department of Labor & Industries. Fatality Narrative: Journeyman Telecommunications Technician Electrocuted After Contacting Overhead Power Line. Release Date: April 1, 2008. Case No.: 07WA03501. SHARP Report No.: 71-70-2008.

http://www.lni.wa.gov/Safety/Research/Face/Files/TelecomTechElectrocuted.pdf. Accessed July 30, 2013

Michigan State University. MIFACE Case 239. 41-year-old male lineman for a telecommunications company died while he was servicing and connecting a U-Verse cable system on a 40-foot utility pole located in a residential neighborhood. Undated. http://www.oem.msu.edu/MIFACE_Constr_Div/Case239.pdf. Accessed June 6, 2013

Occupational Safety and Health Administration. FY2011 Pilot Follow-on Susan Harwood Grant to Western Iowa Tech Community College, Sioux City, IA, $76,500. The grantee will provide tower erection training targeting the high-hazard communications tower erection and wind turbine construction industries. Training will include qualified climber, fall protection equipment usage, confined spaces, and vertical safety hazards. https://www.osha.gov/dte/sharwood/2011_grant_recipients.html. Accessed July 29, 2013

Occupational Safety and Health Administration. 2010 Developmental Susan Harwood Grant to Steelworkers Charitable and Educational Organization, Pittsburgh, PA, $207,000. The grantee will develop culturally and linguistically appropriate health and safety education and technical assistance that address the needs of USW and CWA members. The targeted audiences are high-risk, underserved, immigrants, Spanish-speaking, and limited English proficiency workers. https://www.osha.gov/dte/sharwood/2010_grant_recipients.html. Accessed July 29, 2013

TEMPORARY LABOR INDUSTRY

Surveillance Goal 14.2: Determine if differences are present in health status between temporary or contingent workers and the remaining workers in selected industries based on available surveillance data.

Alterman T, Luckhaupt SE, Dahlhamer JM, Ward BW, Calvert GM. Prevalence rates of work organization characteristics among workers in the U.S.: Data from the 2010 National Health Interview Survey. Am J Ind Med. 2013 June;56(6):647-59. http://dx.doi.org/10.1002/ajim.22108.

Lowry SJ, Blecker H, Camp J, De Castro B, Hecker S, Arbabi S, Traven N, Seixas NS. Possibilities and challenges in occupational injury surveillance of day laborers. Am J Ind Med. 2010 Feb;53(2):126-34. http://dx.doi.org/10.1002/ajim.20741.

Smith CK, Silverstein BA, Bonauto DK, Adams D, Fan ZJ. Temporary workers in Washington state. Am J Ind Med. 2010 Feb;53(2):135-45. http://dx.doi.org/10.1002/ajim.20728.

Nicholson VJ, Bunn TL, Costich JF. Disparities in work-related injuries associated with worker compensation coverage status. Am J Ind Med. 2008 Jun;51(6):393-8. http://dx.doi.org/10.1002/ajim.20565.

Intermediate Goal 14.3: Produce peer-reviewed journal articles on differences in exposures or health conditions that may be attributable to employment status for

temporary or contingent workers and promote a set of best practice recommendations to reduce any differences.

Research Goal 14.3.2: By 2015, conduct investigations of comprehensive safety and health programs in industries with substantial populations of temporary or contingent workers and identify best practices for the shared occupational health and safety responsibilities of the temporary agency and the host employer.

Roquelaure Y, LeManach AP, Ha C, Poisnel C, Bodin J, Descatha A, Imbernon E. Working in temporary employment and exposure to musculoskeletal constraints. Occup Med (Lond). 2012 Oct;62(7):514-8. http://dx.doi.org/10.1093/occmed/kqs004.

Massachusetts Department of Public Health, Occupational Health Surveillance Program. Temporary Agencies and Worksite Employers Share Responsibility for Keeping Temporary Workers Safe. April 2012. http://www.mass.gov/eohhs/docs/dph/occupational-health/temp-workers.pdf. Also, http://www.mass.gov/eohhs/gov/departments/dph/programs/health-stats/ohsp/fatal-injury/educational-materials/fatality-assessment-and-control-evaluation-facts.html for versions in Portuguese and Spanish. Accessed June 3, 2013

Research Goal 14.3.3: By 2015, identify the more common language, literacy and cultural barriers to the success of health and safety training materials for temporary or contingent workers and identify best practices to ensure effective training methods.

Leclere OA, López RA. The jornalero: perceptions of health care resources of immigrant day laborers. J Immigr Minor Health. 2012 Aug;14(4):691-7. http://dx.doi.org/10.1007/s10903-011-9516-z.

Guerrina RT, Burns CM, Conlon H. Contingent workers. AAOHN J. 2011 Mar;59(3):107-9. http://www.ncbi.nlm.nih.gov/pubmed/21366200.

Quinlan M, Sokas RK. Community campaigns, supply chains, and protecting the health and well-being of workers. Am J Public Health. 2009 Nov;99 Suppl 3:S538-46. http://dx.doi.org//10.2105/AJPH.2008.149120.

Kawachi I. Globalization and workers' health. Ind Health. 2008 Oct;46(5):421-3. Review. http://dx.doi.org/10.2486/indhealth.46.421.

Massachusetts Department of Public Health, Occupational Health Surveillance Program. Temporary Laborer was Fatally Injured when Caught between an Idler Pulley and Conveyor Belt at a Recycling Facility – Massachusetts. Massachusetts Case Report: 05-MA-018, September 10, 2007. http://www.cdc.gov/niosh/face/stateface/ma/05MA018.html. Accessed June 3, 2013

WASTE COLLECTION AND DISPOSAL

Intermediate Goal 15.2: Create an industry-wide council, including management and worker representatives, to collaborate on developing comprehensive health and safety guidelines or standards for the solid waste industry.

Accomplished – **Translation Goal 15.2.1:** By 2011, create and disseminate health communication materials promoting adherence to safety and health requirements, e.g.,

ANSI, DOT (hours of service, driver qualification, and drug and alcohol testing) and Federal and State OSHA through trade associations, labor unions, and government agencies.

Public Works Magazine. Waste industry releases revised standard. October 1, 2012. http://www.pwmag.com/solid-waste/waste-industry-releases-revised-standard.aspx. Accessed June 3, 2013

NIOSH. NIOSH Factsheet: Solid Waste Industry. DHHS (NIOSH) Document No. 2012-140. http://www.cdc.gov/niosh/docs/2012-140/. Accessed June 3, 2013

Utterback, DF. Solid Waste Industry Reduces Fatalities and Injuries. WasteAdvantage Magazine, September 2011. http://wasteadvantagemag.com/solid-waste-industry-reduces-fatalities-and-injuries/. Accessed June 3, 2013

Biderman D. Safety First: NIOSH Numbers. Waste 360 Magazine. June 24, 2012. http://waste360.com/blog/safety-first-niosh-numbers. Accessed June 3, 2013

Waste Age Staff. NSWMA, NIOSH Team Up for Safety Bill Stuffer (with video). May 17, 2011. http://waste360.com/safety/nswma-niosh-team-safety-bill-stuffer-video. Accessed June 3, 2013

Grzeskowiak J. Improving Safety in Solid Waste Operations. Waste Age Magazine. June 1, 2011. http://waste360.com/safety/improving-safety-solid-waste-operations-related-video. Accessed June 3, 2013

Anonymous. NSWMA Offers Safety Videos in Spanish. Waste Age Magazine. January 15, 2009. http://waste360.com/news/NSWMA_safety_videos_Spanish. Accessed June 3, 2013

Intermediate Goal 15.3: Create, disseminate, and evaluate the effectiveness of best practices guidance documents for the solid waste industry.

Accomplished – **Research Goal 15.3.3:** By 2010, evaluate waste collection worker safety and health public education campaigns for roadway hazards such as "Slow Down to Get Around" that are designed to increase public cooperation.

Biderman D. Waste Safety Program Aims at Distracted Drivers. Waste Age Magazine. June 1, 2011. http://waste360.com/blog/waste-safety-program-aims-distracted-drivers. Accessed June 3, 2013

National Solid Wastes Management Association (NSWMA). Slow Down to Get Around. http://www.environmentalistseveryday.org/solid-waste-management/environmental-waste-garbage-safety-first/waste-collection-employee-safety.php. Accessed June 3, 2013

Anonymous. Jagler introduces 'Slow Down to Get Around' bill. Columbus Journal. Columbus, WI, May 8, 2013. http://www.wiscnews.com/news/local/article_bd2b7904-adee-11e2-8758-001a4bcf887a.html. Accessed June 3, 2013

Kalamazoo Gazette Staff. Garbage-truck etiquette in summer also makes you safe. Mlive. Grand Rapids, MI, June 16, 2009. http://www.mlive.com/business/west-michigan/index.ssf/2009/06/garbagetruck_etiquette_in_summ.html. Accessed June 3, 2013

Accomplished – **Dissemination Goal 15.3.6:** By 2013, provide effective training materials for the solid waste industry through trade associations, labor unions, insurance companies, and government agencies.

Occupational Safety and Health Administration. FY2012 Developmental Follow-on Susan Harwood Grant to Regents of the University of California at Berkeley, Berkeley, CA, $181,330. The grantee will conduct training that addresses a variety of safety and health hazards facing hard-to-reach workers, immigrants, and young workers concentrated in the restaurant, nail salon, and recycling industries. Training will take place in California. Training and materials will be available in English and Spanish. A select number of materials will be available in Chinese. https://www.osha.gov/dte/sharwood/2012_grant_recipients.html. Accessed July 29, 2013

Occupational Safety and Health Administration. FY2011 Developmental Follow-on Susan Harwood Grant to Regents of the University of California, The - Los Angeles, Los Angeles, CA, $187,000. The grantee will work with local labor federations and unions to provide health and safety awareness classes for low wage and immigrant workers in Southern California. The target audiences are workers in hotel, car wash and waste/recycling industries. Topics will include chemical safety, material safety data sheets, and noise exposure. The training and/or materials will be offered in English and Spanish. https://www.osha.gov/dte/sharwood/2011_grant_recipients.html. Accessed July 29, 2013

Occupational Safety and Health Administration. FY2012 Developmental Follow-on Susan Harwood Grant to Regents of the University of California at Los Angeles, Los Angeles, CA, $181,390. The grantee will offer culturally and language appropriate training to low wage immigrant workers in the hotel, car wash and waste industries. Training and materials will target the large Southern California Spanish-speaking workforce. Classes will provide training on topics such as hazard identification, chemical hazards, ergonomics, worker rights, and effective health and safety committees. https://www.osha.gov/dte/sharwood/2012_grant_recipients.html. Accessed July 29, 2013

Intermediate Goal 15.4: Continue collaborations to identify, develop, and incorporate engineering solutions to eliminate hazards for solid waste collection and disposal operations.

Accomplished – **Research Goal 15.4.1:** By 2011, evaluate the leading causes of injury risk to waste collection and disposal workers and develop reports on alternative designs to mitigate the recognized hazards.

Schlosser O, Huyard A, Rybacki D, Do Quang Z. Protection of the vehicle cab environment against bacteria, fungi and endotoxins in composting facilities. Waste Manag. 2012 Jun;32(6):1106-15. http://dx.doi.org/10.1016/j.wasman.2012.01.013.

Utterback DF, Charles LE, Schnorr TM, Tiesman HM, Storey E, Vossenas P. Occupational Injuries, Illnesses and Fatalities among Workers in the Services Sector Industries: 2003 – 2007. Am J Ind Med. 2012;54:31–41. http://dx.doi.org/10.1097/JOM.0b013e3182398e36.

Bunn TL, Slavova S, Tang M. Injuries among solid waste collectors in the private versus public sectors. Waste Manag Res. 2011 Oct;29(10):1043-52. http://dx.doi.org/10.1177/0734242X11410115.

KY Fatality Assessment & Control Evaluation (FACE) Program, Kentucky Injury Prevention and Research Center. Workers Killed While Collecting Solid Waste. Kentucky Haz Alert. Vol. 8, Issue 3, June 2010. http://www.mc.uky.edu/kiprc/projects/KOSHS/face/pdf/solid%20waste%20collectors%20final.pdf. Accessed June 6, 2013

Olorunnishola OA, Kidd-Taylor A, Byrd L. Occupational injuries and illnesses in the solid waste industry: a call for action. New Solut. 2010;20(2):211-23. http://dx.doi.org/10.2190/NS.20.2.f.

Persoons R, Parat S, Stoklov M, Perdrix A, Maitre A. Critical working tasks and determinants of exposure to bioaerosols and MVOC at composting facilities. Int J Hyg Environ Health. 2010 Sep;213(5):338-47. http://dx.doi.org/10.1016/j.ijheh.2010.06.001.

California Fatality Assessment and Control Evaluation (CA/FACE) Program. A Mechanic Dies When He is Crushed by the Hydraulic Arm of a Recyclable Refuse Collection Truck. California FACE Report #10CA005, 2011. http://www.cdph.ca.gov/programs/ohb-face/Documents/10CA005.pdf. Accessed June 3, 2013

Schlosser O, Huyard A, Cartnick K, Yañez A, Catalán V, Quang ZD. Bioaerosol in composting facilities: occupational health risk assessment. Water Environ Res. 2009 Sep-Oct;81(9):866-77. http://dx.doi.org/10.2175/106143009X407258.

> *Accomplished* – **Translation Goal 15.4.2:** By 2013, collaborate with equipment and vehicle manufacturers to evaluate alternative designs intended to reduce the injury risk for solid waste collection and disposal workers.

Public Works Magazine. Waste industry releases revised standard. October 1, 2012. http://www.pwmag.com/solid-waste/waste-industry-releases-revised-standard.aspx. Accessed June 3, 2013

> *Accomplished* – **Translation Goal 15.4.3:** By 2014, incorporate effective equipment and vehicle design into industry guidelines and national or international standards for waste collection and disposal.

Public Works Magazine. Waste industry releases revised standard. October 1, 2012. http://www.pwmag.com/solid-waste/waste-industry-releases-revised-standard.aspx. Accessed June 3, 2013

MUSCULOSKELETAL DISORDERS

> *Accomplished* – **Surveillance Goal 16.2**: By 2014, evaluate existing data sets such as the National Health Interview Survey (NHIS), the Survey of Occupational Injuries and Illnesses (SOII) and state-based surveillance systems to identify industries or worker populations in the services sector with elevated risks for repetitive strain, upper extremity, lower extremity, lower back or other forms of musculoskeletal disorders.

Luckhaupt SE, Burris DL. How Does Work Affect the Health of the U.S. Population? Free Data from the 2010 NHIS-OHS Provides the Answers. National Institute for Occupational

Safety and Health. 2013. http://blogs.cdc.gov/niosh-science-blog/2013/06/24/nhis/. Accessed on August 20, 2013

Luckhaupt SE, Dahlhamer JM, Ward BW, Sweeney MH, Sestito JP, Calvert-GM. Prevalence and work-relatedness of carpal tunnel syndrome in the working population, United States, 2010 National Health Interview Survey. Am J Ind Med 2013 Jun;56(6):615-624 http://dx.doi.org/10.1002/ajim.22048.

Beach J, Senthilselvan A, Cherry N. Factors affecting work-related shoulder pain. Occup Med (Lond). 2012 Sep;62(6):451-4. http://dx.doi.org/10.1093/occmed/kqs130.

Silva JS Jr, Correa LR, Morrone LC. Evaluation of lumbar overload in hotel maids. Work. 2012;41 Suppl 1:2496-8. http://dx.doi.org/10.3233/WOR-2012-0488-2496.

Chang JH, Wu JD, Liu CY, Hsu DJ. Prevalence of musculoskeletal disorders and ergonomic assessments of cleaners. Am J Ind Med. 2012 Jul;55(7):593-604. http://dx.doi.org/10.1002/ajim.22064.

Harris-Roberts J, Bowen J, Sumner J, Stocks-Greaves M, Bradshaw L, Fishwick D, Barber CM. Work-related symptoms in nail salon technicians. Occup Med (Lond). 2011 Aug;61(5):335-40. http://dx.doi.org/10.1093/occmed/kqr096.

Lindegård A, Wahlström J, Hagberg M, Vilhelmsson R, Toomingas A, Tornqvist EW. Perceived exertion, comfort and working technique in professional computer users and associations with the incidence of neck and upper extremity symptoms. BMC Musculoskelet Disord. 2012 Mar 21;13:38. http://dx.doi.org/10.1186/1471-2474-13-38.

Costa G. Shift work and health: current problems and preventive actions. Saf Health Work. 2010; 1(2):112-23. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3430894/. Accessed August 23, 2013

d'Errico A, Caputo P, Falcone U, Fubini L, Gilardi L, Mamo C, Migliardi A, Quarta D, Coffano E. Risk factors for upper extremity musculoskeletal symptoms among call center employees. J Occup Health. 2010;52(2):115-24. http://dx.doi.org/10.1539/joh.L9117.

Anastassova M, Burkhardt JM. Automotive technicians' training as a community-of-practice: implications for the design of an augmented reality teaching aid. Appl Ergon. 2009 Jul;40(4):713-21. http://dx.doi.org/10.1016/j.apergo.2008.06.008.

Janwantanakul P, Pensri P, Jiamjarasrangsri V, Sinsongsook T. Prevalence of self-reported musculoskeletal symptoms among office workers. Occup Med (Lond). 2008 Sep;58(6):436-8. http://dx.doi.org/10.1093/occmed/kqn072.

Boström M, Dellve L, Thomée S, Hagberg M. Risk factors for generally reduced productivity--a prospective cohort study of young adults with neck or upper-extremity musculoskeletal symptoms. Scand J Work Environ Health. 2008 Apr;34(2):120-32. http://dx.doi.org/10.5271/sjweh.1218.

Haukka E, Leino-Arjas P, Solovieva S, Ranta R, Viikari-Juntura E, Riihimäki H. Co-occurrence of musculoskeletal pain among female kitchen workers. Int Arch Occup Environ Health. 2006 Nov;80(2):141-8. http://dx.doi.org/10.1007/s00420-006-0113-8.

Accomplished – **Intermediate Goal 16.3**: By 2013, ensure that reliable exposure assessment tools and strategies are developed and utilized to reduce musculoskeletal disorders through collaboration of academic institutions, management, labor, trade associations and government agencies.

Accomplished – **Research Goal 16.3.1:** By 2012, develop tools such as questionnaires and checklists for use in state and national surveys, hazard assessments, recognized "problem" work areas, and injury and symptom surveillance for musculoskeletal disorders in services sector industries.

Albin TJ. Measuring the validity and reliability of ergonomic checklists. Work 2012;43(3):381-5. http://www.ncbi.nlm.nih.gov/pubmed/23579376.

Joseph C, Imbeau D, Nastasia I. Measurement consistency among observational job analysis methods during an intervention study. Int J Occup Saf Ergon. 2011;17(2):139-46. http://www.ncbi.nlm.nih.gov/pubmed/21679665.

Matthews RA, Gallus JA, Henning RA. Participatory ergonomics: development of an employee assessment questionnaire. Accid Anal Prev. 2011 Jan;43(1):360-9. http://dx.doi.org/10.1016/j.aap.2010.09.004.

Cann AP, Connolly M, Ruuska R, MacNeil M, Birmingham TB, Vandervoort AA, Callaghan JP. Inter-rater reliability of output measures for a posture matching assessment approach: a pilot study with food service workers. Ergonomics. 2008 Apr;51(4):556-72. http://dx.doi.org/10.1080/00140130701711455.

Accomplished – **Research Goal 16.3.2:** By 2013, develop hazard surveillance checklists and similar tools that require minimal training for use by health and safety committees, employees, and medical personnel and validate them through field studies, exposure assessments, medical screenings and worker interviews.

Eyal L, Ribak J, Badihi Y. Remote online ergonomic assessment in the office environment as compared to face-to-face ergonomic assessment. Work. 2012;41 Suppl 1:516-23. http://dx.doi.org/10.3233/WOR-2012-0206-516.

Tang K, MacDermid JC, Amick BC 3rd, Beaton DE. The 11-item workplace organizational policies and practices questionnaire (OPP-11): examination of its construct validity, factor structure, and predictive validity in injured workers with upper-limb disorders. Am J Ind Med. 2011 Nov;54(11):834-46. http://dx.doi.org/10.1002/ajim.20994.

Norman K, Alm H, Wigaeus Tornqvist E, Toomingas A. Reliability of a questionnaire and an ergonomic checklist for assessing working conditions and health at call centres. Int J Occup Saf Ergon. 2006;12(1):53-68. http://www.ncbi.nlm.nih.gov/pubmed/16554000.

David G, Woods V, Li G, Buckle P. The development of the Quick Exposure Check (QEC) for assessing exposure to risk factors for work-related musculoskeletal disorders. Appl Ergon. 2008 Jan;39(1):57-69. http://dx.doi.org/10.1016/j.apergo.2007.03.002.

IJmker S, Mikkers J, Blatter BM, van der Beek AJ, van Mechelen W, Bongers PM. Test-retest reliability and concurrent validity of a web-based questionnaire measuring workstation and individual correlates of work postures during computer work. Appl Ergon. 2008 Nov;39(6):685-96. http://dx.doi.org/10.1016/j.apergo.2007.12.003.

Research Goal 16.4.2: On an ongoing basis, develop and test the effectiveness of targeted guidance programs for the reduction of repetitive strain and acute and chronic upper extremity, lower extremity, or lower back musculoskeletal disorders that are associated with hazardous tasks or operations.

Yazdani A, Wells R. Prevention of MSD within OHSMS/IMS: a systematic review of risk assessment strategies. Work. 2012;41 Suppl 1:2765-7. http://dx.doi.org/10.3233/WOR-2012-0522-2765.

Wurzelbacher S, Jin Y. A framework for evaluating OSH program effectiveness using leading and trailing metrics. J Safety Res. 2011 Jun;42(3):199-207. http://dx.doi.org/10.1016/j.jsr.2011.04.001.

Lowe BD, Krieg EF. Relationships between observational estimates and physical measurements of upper limb activity. Ergonomics. 2009 May;52(5):569-83. http://dx.doi.org/10.1080/00140130802449682.

Denis D, St-Vincent M, Imbeau D, Jetté C, Nastasia I. Intervention practices in musculoskeletal disorder prevention: a critical literature review. Appl Ergon. 2008 Jan;39(1):1-14. http://dx.doi.org/10.1016/j.apergo.2007.02.002.

Stover B, Silverstein B, Wickizer T, Martin DP, Kaufman J. Accuracy of a disability instrument to identify workers likely to develop upper extremity musculoskeletal disorders. J Occup Rehabil. 2007 Jun;17(2):227-45. http://dx.doi.org/10.1007/s10926-007-9083-2.

Research Goal 16.5.1: By 2014, evaluate the risks for occupational musculoskeletal disorders from repeated or sustained exertions.

Gallagher S, Heberger JR. Examining the interaction of force and repetition on musculoskeletal disorder risk: a systematic literature review. Hum Factors. 2013 Feb;55(1):108-24. http://www.ncbi.nlm.nih.gov/pubmed/23516797.

Beach J, Senthilselvan A, Cherry N. Factors affecting work-related shoulder pain. Occup Med (Lond). 2012 Sep;62(6):451-4. http://dx.doi.org/10.1093/occmed/kqs130.

Silva JS Jr, Correa LR, Morrone LC. Evaluation of lumbar overload in hotel maids. Work. 2012;41 Suppl 1:2496-8. http://dx.doi.org/10.3233/WOR-2012-0488-2496.

Fethke NB, Gerr F, Anton D, Cavanaugh JE, Quickel MT. Variability in muscle activity and wrist motion measurements among workers performing non-cyclic work. J Occup Environ Hyg. 2012;9(1):25-35. http://dx.doi.org/10.1080/15459624.2012.634361.

Erick PN, Smith DR. A systematic review of musculoskeletal disorders among school teachers. BMC Musculoskelet Disord. 2011 Nov 17;12:260. http://dx.doi.org/10.1186/1471-2474-12-260.

Dale AM, Rohn AE, Patton A, Standeven J, Evanoff B. Variability and misclassification of worker estimated hand force. Appl Ergon. 2011 Nov;42(6):846-51. http://dx.doi.org/10.1016/j.apergo.2011.01.008.

Smith CK, Bonauto DK, Silverstein BA, Wilcox D. Inter-rater reliability of physical examinations in a prospective study of upper extremity musculoskeletal disorders. J Occup Environ Med. 2010 Oct;52(10):1014-8. http://dx.doi.org/10.1097/JOM.0b013e3181f4396b.

Cutlip RG, Baker BA, Hollander M, Ensey J. Injury and adaptive mechanisms in skeletal muscle. J Electromyogr Kinesiol. 2009 Jun;19(3):358-72. http://dx.doi.org/10.1016/j.jelekin.2008.06.007.

Morse TF, Warren N, Dillon C, Diva U. A population based survey of ergonomic risk factors in Connecticut: distribution by industry, occupation, and demographics. Conn Med. 2007 May;71(5):261-8. http://www.ncbi.nlm.nih.gov/pubmed/17526381.

Accomplished – **Research Goal 16.5.3:** By 2013, examine the risk of work-related musculoskeletal disorders for computer users with repetitive jobs associated with low-level static exertions and mental demands.

Levanon Y, Gefen A, Lerman Y, Givon U, Ratzon NZ. Reducing musculoskeletal disorders among computer operators: comparison between ergonomics interventions at the workplace. Ergonomics. 2012;55(12):1571-85. http://dx.doi.org/10.1080/00140139.2012.726654.

Sonne M, Villalta DL, Andrews DM. Development and evaluation of an office ergonomic risk checklist: ROSA--rapid office strain assessment. Appl Ergon. 2012 Jan;43(1):98-108. http://dx.doi.org/10.1016/j.apergo.2011.03.008.

Lima TM, Coelho DA. Prevention of musculoskeletal disorders (MSDs) in office work: a case study. Work. 2011;39(4):397-408. http://dx.doi.org/10.3233/WOR-2011-1190.

Levanon Y, Gefen A, Lerman Y, Givon U, Ratzon NZ. Validity and reliability of upper extremity three-dimensional kinematics during a typing task. Gait Posture. 2010 Oct;32(4):469-74. http://dx.doi.org/10.1016/j.gaitpost.2010.07.003.

Klussmann A, Gebhardt H, Liebers F, Rieger MA. Musculoskeletal symptoms of the upper extremities and the neck: a cross-sectional study on prevalence and symptom-predicting factors at visual display terminal (VDT) workstations. BMC Musculoskelet Disord. 2008 Jun 27;9:96. http://dx.doi.org/10.1186/1471-2474-9-96.

Baker NA, Sussman NB, Redfern MS. Discriminating between individuals with and without musculoskeletal disorders of the upper extremity by means of items related to computer keyboard use. J Occup Rehabil. 2008 Jun;18(2):157-65. http://dx.doi.org/10.1007/s10926-008-9127-2.

Fang S, Dropkin J, Herbert R, Triola D, Landsbergis P. Workers' compensation experiences of computer users with musculoskeletal disorders. Am J Ind Med. 2007 Jul;50(7):512-8. http://dx.doi.org/10.1002/ajim.20478.

SURVEILLANCE

Accomplished – **Research Goal 17.1.1:** By 2008, develop a comprehensive list of recognized surveillance systems that have been or may be used to evaluate numbers and rates of illnesses, injuries, and fatalities by services industry or occupation.

NIOSH. Workplace Data and Statistics Gateway. http://www.cdc.gov/niosh/data/. Accessed June 4, 2013

Accomplished – **Research Goal 17.1.2:** By 2009, utilize state and national employment data to estimate the demographic and employment characteristics of the workers in the service sector.

Utterback DF, Charles LE, Schnorr TM, Tiesman HM, Storey E, Vossenas P. Occupational Injuries, Illnesses and Fatalities among Workers in the Services Sector Industries: 2003 – 2007. Am J Ind Med. 2012;54:31–41. http://dx.doi.org/10.1097/JOM.0b013e3182398e36.

Kennedy VC. Public health workforce employment in US public and private sectors. J Public Health Manag Pract. 2009 May-Jun;15(3):E1-8. http://www.ncbi.nlm.nih.gov/pubmed/19363392.

Boehmer TK, Jones TS, Ghosh TS, McCammon CS, Vogt RL. Cluster of presumed organic dust toxic syndrome cases among urban landscape workers-Colorado, 2007. Am J Ind Med. 2009 Jul;52(7):534-8. http://dx.doi.org/10.1002/ajim.20699.

Accomplished – **Research Goal 17.1.3:** Beginning in 2009, provide surveillance data analysis reports at least biannually to support priorities, and identify trends and emerging issues in the services sector.

Biddle EA. Is the societal burden of fatal occupational injury different among NORA industry sectors? J Safety Res. 2013 Feb;44:7-16. http://dx.doi.org/10.1016/j.jsr.2012.09.005.

Lee-DJ; Davila-EP; LeBlanc-WG; Caban-Martinez-AJ; Fleming-LE; Christ-S; McCollister-K; Arheart-K; Sestito-JP. Morbidity and disability among workers 18 years and older in the Services sector, 1997-2007. Cincinnati, OH: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS (NIOSH) Publication No. 2012-160, 2012 Oct;1-116. http://www.cdc.gov/niosh/docs/2012-160/. Accessed July 29, 2013

Massachusetts Department of Public Health Occupational Health Surveillance Program. Burden of Asthma among Massachusetts Service Workers, 2010. SENSOR Occupational Lung Disease Bulletin, October 2012. http://www.mass.gov/eohhs/docs/dph/occupational-health/sensor-lung-disease-bulletins/oct2012.pdf. Accessed June 6, 2013

Pegula S, Utterback DF. Fatal injuries among grounds maintenance workers: United States, 2003--2008. MMWR Morb Mortal Wkly Rep. 2011 May 6;60(17):542-6. http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6017a3.htm. Accessed July 29, 2013

Menéndez CK, Havea SA. Temporal patterns in work-related fatalities among foreign-born workers in the US, 1992-2007. J Immigr Minor Health. 2011 Oct;13(5):954-62. http://dx.doi.org/10.1007/s10903-010-9379-8.

Arcury-Quandt AE, Gentry AL, Marín AJ. Hazardous materials on golf courses: experience and knowledge of golf course superintendents and grounds maintenance workers from seven states. Am J Ind Med. 2011 Jun;54(6):474-85. http://dx.doi.org/10.1002/ajim.20942.

Blanciforti LA. Economic burden of dermatitis in US workers [corrected]. J Occup Environ Med. 2010 Nov;52(11):1045-54. http://dx.doi.org/10.1097/JOM.0b013e3181f475b2.

Buckley JP, Sestito JP, Hunting KL. Fatalities in the landscape and horticultural services industry, 1992-2001. Am J Ind Med. 2008 Sep;51(9):701-13. http://dx.doi.org/10.1002/ajim.20604.

Oklahoma State Department of Health Injury Prevention Service. Work-Related Deaths in Oklahoma, 1998-2007. July 31, 2008. http://www.ok.gov/health2/documents/Work-related_Deaths_1998-2007.pdf. Accessed Jun 6, 2013

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Accomplished – **Research Goal 17.1.4:** By 2013, complete an analysis of occupational safety and health surveillance systems to determine the reliability of counts and rates for more serious injuries and illnesses.

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Accomplished – **Research Goal 17.1.5:** By 2013, create recommendations to enhance the systematic collection of occupational illness and disease incidence data and injury data for populations who are not included in current national surveys such as public administration workers and many education sector employees.

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Michigan State University and the Michigan Department of Labor and Economic Growth. 2007 Annual Summary of Occupational Disease Reports to the Michigan Department of Labor and Economic Growth. December 17, 2008. http://www.oem.msu.edu/userfiles/file/Annual%20Reports/OD/07ODAnnRptFINAL.pdf. Accessed June 6, 2013

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Accomplished – **Research Goal 17.2.2:** By 2011, collaborate with state health and labor departments where they have direct relationships with state-managed workers' compensation programs to develop strategies for data sharing, analysis and reporting with a primary interest in identifying needs for effective interventions.

Sears JM, Bowman SM, Adams D, Silverstein BA. Who pays for work-related traumatic injuries? payer distribution in Washington State by ethnicity, injury severity, and year (1998-2008). Am J Ind Med. 2013 July;56(7):742-54. http://dx.doi.org/10.1002/ajim.22179.

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Anderson NJ, Bonauto DK, Adams D. Work-related amputations in Washington state, 1997-2005. Am J Ind Med. 2010 Jul;53(7):693-705. http://dx.doi.org/10.1002/ajim.20815.

Forst L, Avila S, Anozie S, Rubin R. Traumatic occupational injuries in Hispanic and foreign born workers. Am J Ind Med. 2010 Apr;53(4):344-51. http://dx.doi.org/10.1002/ajim.20748.

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Use of Workers' Compensation Data for Occupational Safety and Health: Proceedings from June 2012 Workshop, Utterback DF, Schnorr TM, eds. Cincinnati, OH: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS (NIOSH) Publication No. 2013-147, 2013 May. http://www.cdc.gov/niosh/docs/2013-147/. Accessed July 29, 2013

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Bertke SJ, Wurzelbacher SJ, Bell J, Lampl ML, Robins D. Development and evaluation of an auto-coding model for coding unstructured text data among workers' compensation claims.

Bonauto D, Wuellner S, Spann C, Reister N. OSHA recordkeeping practices and workers compensation claims in Washington; results from a survey of Washington BLS respondents.

Bookman JA, Robins D, Mujumdar M, Jepsen SD. Describing Agricultural Occupational Injury in Ohio Using Bureau of Workers' Compensation Claims.

Davis L, Rosenman KD, Shor G, Simms E, Miller-K. State health agencies' access to state workers' compensation data: results of an assessment conducted by the council of state and territorial epidemiologists, 2012.

Foley M, Rauser E, Rappin C, Bonauto D. Using Workers Compensation Data to Conduct OHS Surveillance of Temporary Workers in Washington State.

Forst L, Friedman L. Occupational Amputations in Illinois: Data Linkage to Target Interventions.

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Rosenman KD, Kica J, Largo-T. Completeness of workers' compensation data in identifying work-related injuries.

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Use of Workers' Compensation Data for Occupational Injury and Illness Prevention: Proceedings from September 2009 Workshop, Utterback DF, Schnorr TM, eds. Cincinnati, OH: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health,

DHHS (NIOSH) Publication No. 2010-152, 2010 August. http://www.cdc.gov/niosh/docs/2010-152/. Accessed July 29, 2013

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Silverstein BA. Safety & Health Assessment and Research for Prevention (SHARP) Program. In Use of Workers' Compensation Data for Occupational Injury and Illness Prevention: Proceedings from September 2009 Workshop.

Harrison R, Flattery J. State-Based Occupational Injury and Disease Surveillance.

Bonauto DK. Identifying Vulnerable Populations in Workers' Compensation Data: Limited English Proficiency Workers and Temporary Agency Workers.

Foley MP. Linking Workers' Compensation and Employment Security Data for Occupational Health and Safety Surveillance.

Forst L, Friedman L. Data Linkages for Prevention: Traumatic Injuries in Construction.

Leigh JP. Past, Present and Future Uses of Some Workers' Compensation Data.

Oleinick A, Zaidman B. Harmonizing Existing Databases Counting Workplace Injuries and Illnesses.

HAIR AND NAIL SALONS

Surveillance Goal 18.1: Establish programs for systematic collection and analysis of occupational illnesses and injuries in nail and hair salon workers and publish results in the open literature through collaboration of State and Federal programs.

Gallicchio L, Miller SR, Greene T, Zacur H, Flaws JA. Somatic symptoms among cosmetologists compared to women in other occupations. J Womens Health (Larchmt). 2011 Apr;20(4):605-15. http://dx.doi.org/10.1089/jwh.2010.2342.

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Gallicchio L, Miller SR, Greene T, Zacur H, Flaws JA. Adverse health outcomes among cosmetologists and noncosmetologists in the Reproductive Outcomes of Salon Employees (ROSE) study. J Toxicol Environ Health A. 2011;74(1):52-61. http://dx.doi.org/10.1080/15287394.2010.514227.

Herdt-Losavio ML, Lin S, Druschel CM, Hwang SA, Mauer MP, Carlson GA. A nested case-control study of low birthweight among cosmetologists. Int Arch Occup Environ Health. 2011 Aug;84(6):601-8. http://dx.doi.org/10.1007/s00420-010-0585-4.

Quach T, Doan-Billing PA, Layefsky M, Nelson D, Nguyen KD, Okahara L, Tran AN, Von Behren J, Reynolds P. Cancer incidence in female cosmetologists and manicurists in California, 1988-2005. Am J Epidemiol. 2010 Sep 15;172(6):691-9. http://dx.doi.org/10.1093/aje/kwq190.

Gallicchio L, Miller S, Greene T, Zacur H, Flaws JA. Menstrual cycle abnormalities among cosmetologists: the Reproductive Outcomes in Salon Employees (ROSE) study. Reprod Sci. 2010 Jan;17(1):20-8. http://dx.doi.org/10.1177/1933719109345163.

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Takkouche B, Regueira-Méndez C, Montes-Martínez A. Risk of cancer among hairdressers and related workers: a meta-analysis. Int J Epidemiol. 2009 Dec;38(6):1512-31. http://dx.doi.org/10.1093/ije/dyp283.

Axmon A, Rylander L. Birth weight and fetal growth in infants born to female hairdressers and their sisters. Occup Environ Med. 2009 Mar;66(3):198-204. http://dx.doi.org/10.1136/oem.2008.039784.

Research Goal 18.2.1: Complete representative exposure assessments of hazardous chemicals from nail and hair products with appropriate environmental sampling and biomonitoring methods.

Tsigonia A, Lagoudi A, Chandrinou S, Linos A, Evlogias N, Alexopoulos EC. Indoor air in beauty salons and occupational health exposure of cosmetologists to chemical substances. Int J Environ Res Public Health. 2010 Jan;7(1):314-24. http://dx.doi.org/10.3390/ijerph7010314.

Kronholm Diab K, Jönsson BA, Axmon A, Nielsen J. Work-related airway symptoms, nasal reactivity and health-related quality of life in female hairdressers: a follow-up study during exposure. Int Arch Occup Environ Health. 2012 Dec 23. http://dx.doi.org/10.1007/s00420-012-0835-8.

Quach T, Gunier R, Tran A, Von Behren J, Doan-Billings PA, Nguyen KD, Okahara L, Lui BY, Nguyen M, Huynh J, Reynolds P. Characterizing workplace exposures in Vietnamese women working in California nail salons. Am J Public Health. 2011 Dec;101 Suppl 1:S271-6. http://dx.doi.org/10.2105/AJPH.2010.300099.

Quach T, Nguyen KD, Doan-Billings PA, Okahara L, Fan C, Reynolds P. A preliminary survey of Vietnamese nail salon workers in Alameda County, California. J Community Health. 2008 Oct;33(5):336-43. http://dx.doi.org/10.1007/s10900-008-9107-7.

Research Goal 18.2.2: Evaluate the potential relations between hazardous chemical exposures from nail and hair care products and illnesses and injuries in nail and hair salon workers.

Peretz J, Gallicchio L, Miller S, Greene T, Zacur H, Flaws JA. Infertility among cosmetologists. Reprod Toxicol. 2009 Nov;28(3):359-64. http://dx.doi.org/10.1016/j.reprotox.2009.05.068.

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Halliday-Bell JA, Gissler M, Jaakkola JJ. Work as a hairdresser and cosmetologist and adverse pregnancy outcomes. Occup Med (Lond). 2009 May;59(3):180-4. http://dx.doi.org/10.1093/occmed/kqp017.

Herdt-Losavio ML, Lin S, Druschel CM, Hwang SA, Mauer MP, Carlson GA. The risk of having a low birth weight or preterm infant among cosmetologists in New York State. Matern Child Health J. 2009 Jan;13(1):90-7. http://dx.doi.org/10.1007/s10995-008-0324-6.

Hougaard MG, Menné T, Søsted H. Occupational eczema and asthma in a hairdresser caused by hair-bleaching products. Dermatitis. 2012 Nov-Dec;23(6):284-7. http://www.ncbi.nlm.nih.gov/pubmed/23169211.

Bradshaw L, Harris-Roberts J, Bowen J, Rahman S, Fishwick D. Self-reported work-related symptoms in hairdressers. Occup Med (Lond). 2011 Aug;61(5):328-34. http://dx.doi.org/10.1093/occmed/kqr089.

Intermediate Goal 18.4: By 2016, disseminate occupational injury prevention information for hair and nail salon establishments through collaborative efforts of product manufacturers, suppliers, employers, employees and their representatives, and government agencies.

Research Goal 18.4.1: Identify the leading risks for injuries among hair and nail salon workers such as: musculoskeletal disorders; slips, trips and falls; and workplace violence.

Tsigonia A, Tanagra D, Linos A, Merekoulias G, Alexopoulos EC. Musculoskeletal disorders among cosmetologists. Int J Environ Res Public Health. 2009 Dec;6(12):2967-79. http://dx.doi.org/10.3390/ijerph6122967.

Translation Goal 18.4.2: Disseminate effective injury prevention information to employers and employees through product manufacturers, suppliers, trade associations, labor unions, and community groups.

Massachusetts Department of Public Health, Occupational Health Surveillance Program. Hair straightening with health risks. SENSOR Occupational Lung Disease Bulletin,Winter 2011-2012. http://www.mass.gov/eohhs/docs/dph/occupational-health/sensor-lung-disease-bulletins/winter2011-2012.pdf. Accessed June 6, 2013

Roelofs C, Shoemaker P, Skogstrom T, Acevedo P, Kendrick J, Nguyen N. The Boston Safe Shops model: an integrated approach to community environmental and occupational health. Am J Public Health. 2010 Apr 1;100 Suppl 1:S52-5. http://dx.doi.org/10.2105/AJPH.2009.176511.

Quach T, Liou J, Fu L, Mendiratta A, Tong M, Reynolds P. Developing a proactive research agenda to advance nail salon worker health, safety, and rights. Prog Community Health Partnersh. 2012 Spring;6(1):75-82. http://dx.doi.org/10.1353/cpr.2012.0005.

Roelofs C, Azaroff LS, Holcroft C, Nguyen H, Doan T. Results from a community-based occupational health survey of Vietnamese-American nail salon workers. J Immigr Minor Health. 2008 Aug;10(4):353-61. http://dx.doi.org/10.1007/s10903-007-9084-4.

Occupational Safety and Health Administration. FY2011 Developmental Follow-on Susan Harwood Grant to Regents of the University of California - Berkeley, Berkeley, CA, $187,000. The grantee will provide training to low-income, immigrant and youth workers employed in small businesses in Northern California. The target audiences are workers in nail salons, restaurants, janitorial services, residential care, and landscaping services. The training and/or materials will be offered in English, Vietnamese, and Spanish. https://www.osha.gov/dte/sharwood/2011_grant_recipients.html. Accessed July 29, 2013

Occupational Safety and Health Administration. FY2011 Developmental Follow-on Susan Harwood Grant to Georgia Tech Applied Research Corporation, Atlanta, GA, $187,000. The grantee will provide training for young workers, employers, teachers and parents in the fields of healthcare and cosmetology through its Southeast Center for Young Worker Safety and Health Center. Topics will include young worker rights and responsibilities, identification of workplace hazards, respiratory protection, bloodborne pathogens, ergonomics, and workplace violence. https://www.osha.gov/dte/sharwood/2011_grant_recipients.html. Accessed July 29, 2013

Occupational Safety and Health Administration. FY2011 Developmental Susan Harwood Grant to Boat People, SOS Inc., Falls Church, VA, $175,000. The grantee will build long term health and safety capacity and provide training and educational materials on hazards (including exposure to toxic substances) and means of prevention in the nail care industry. Training will also cover OSHA's hazard communication standard. The target audience includes Vietnamese nail salon workers and owners in California, the District of Columbia, Maryland, Texas, and Virginia.
https://www.osha.gov/dte/sharwood/2011_grant_recipients.html. Accessed July 29, 2013

Occupational Safety and Health Administration. FY2011 Pilot Susan Harwood Grant to MinKwon Center for Community Action, Inc., Flushing, NY, $78,000. The pilot grantee will develop expertise and provide training to workers on hazards in the nail salon and construction industries. The grantee will provide training to high-risk and limited-English workers. Training and materials will be developed for a low literacy audience and be provided in Korean, Spanish, and Nepali.
https://www.osha.gov/dte/sharwood/2011_grant_recipients.html. Accessed July 29, 2013

Occupational Safety and Health Administration. FY2012 Developmental Follow-on Susan Harwood Grant to Regents of the University of California at Berkeley, Berkeley, CA, $181,330. The grantee will conduct training that addresses a variety of safety and health hazards facing hard-to-reach workers, immigrants, and young workers concentrated in the restaurant, nail salon, and recycling industries. Training will take place in California. Training and materials will be available in English and Spanish. A select number of materials will be available in Chinese.
https://www.osha.gov/dte/sharwood/2012_grant_recipients.html. Accessed July 29, 2013

Occupational Safety and Health Administration. FY2012 Developmental Follow-on Susan Harwood Grant to Georgia Tech Applied Research Corporation, Atlanta, GA, $181,350. The grantee will provide training on workplace hazards targeting young workers and employers

of young workers specifically in the healthcare, cosmetology, culinary and construction industries. Training will be focused in the South and Southeast including Texas, Louisiana, South Carolina, North Carolina, Tennessee and Kentucky. https://www.osha.gov/dte/sharwood/2012_grant_recipients.html. Accessed July 29, 2013

Occupational Safety and Health Administration. FY2012 Developmental Follow-on Susan Harwood Grant to Boat People, SOS Inc., Falls Church, VA, $166,250. The grantee will provide train-the-trainer classes and employer and worker training classes regarding chemical hazards in the nail salon industry. Training will target small business, non-English speaking/limited English speaking, and hard to reach workers. Training materials will be translated into Vietnamese. https://www.osha.gov/dte/sharwood/2012_grant_recipients.html. Accessed July 29, 2013