

NIOSH Healthcare and Social Assistance (HCSA) Program:

Response to HSCA Expert Review Panel's Report

November 2018



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Introduction

The NIOSH Healthcare and Social Assistance (HCSA) Program addresses occupational safety and health issues affecting over 21 million workers. Industries covered by the HCSA program include healthcare industries (ambulatory healthcare services, hospitals, and nursing and residential care facilities) and social assistance. Also, because of the many parallels between human healthcare and animal healthcare, the HCSA Program covers two veterinary medicine/animal care (VM/AC) industries (veterinary services and pet care) and addresses VM/AC issues in other industries that employ laboratory animal care workers such as zoos and botanical gardens, academic institutions, pharmaceutical and biotechnology companies, and others.

NIOSH convened an expert panel in 2017 to review the relevance and impact of NIOSH work conducted specifically in the human healthcare component of HCSA Program during the second decade of the National Occupational Research Agenda (NORA; between 2006 and 2016). The review did not include social assistance, which shares many issues with healthcare since the Program addressed this area less intensively; the review also did not include veterinary medicine/animal care, since the Program started addressing this area fairly late in the decade. Because an important focus of the panel's review was evaluating past efforts conducted during the second decade of NORA, its retrospective review was organized according to four of the second decade priority areas (Safe and Healthy Workplaces; Musculoskeletal Disorders and Patient Mobilization; Hazardous Drugs and Chemicals; and Infectious Disease and Sharps). The HCSA Program greatly appreciates the panel's review. It commended NIOSH for the level of expertise of its researchers and found that its priority areas of work were appropriately focused and highly relevant. The panel noted that "activities were solidly justified based on cited evidence" and noted a number of major contributions and accomplishments of the program. As a result, the panel assigned the HCSA Program a relevance score of 4.5 on a 5 point scale. The panel noted that outputs produced from NIOSH's research program activities are "*likely* to result in improvement in worker safety and health." However, the panel recommended that the HCSA Program "closely link their important work to actual reductions in illness and injury" noting that proxies "such as education material and research article downloads, knowledge and satisfaction surveys, and environmental design recommendations, while appropriate and useful, may not always translate into harm reduction." In view of this, the panel assigned the HCSA Program an impact score of 3.5 on a 5 point scale, resulting in an overall score of 8.0 on a 10 point scale.

The panel made recommendations for consideration for future work of the HCSA Program in the healthcare industries. The panel outlined several broad themes that crossed specific areas of work. These included the difficulty in documenting the impact of NIOSH products such as research and educational and training materials on reduction of injuries and illnesses among workers. In assessing its research impact, NIOSH emphasizes using "intermediate outcomes" which are measures of uptake of its work by a variety of stakeholders to assess research impact. The panel urged NIOSH to take these measurements further – to measure uptake and use of products, to measure behavior and culture change in response to use of NIOSH products, to document specific links between NIOSH products and policy changes, and to assess the impact of NIOSH efforts on reductions in illness and injury. The panel recommended that NIOSH engage in more intervention effectiveness research to address these issues. The panel also suggested a number of specific topics for research.

This *Response to the HCSA Expert Review Panel's Report* addresses how the panel's recommendations will inform the plans of the program going forward. It provides an overview of the HCSA Program's goals within NIOSH's 2019-2023 strategic plan (which are shown in Appendix 1 and address all parts of the HCSA Program including the social assistance and VM/AC industries) and details how NIOSH's HCSA Program will integrate the Panel's recommendations into the strategic plan.

Overview of Panel Recommendations

The content of the panel's report included identification of gaps and recommendations for potential future efforts in the four priority areas from the second decade of NORA. These are discussed below and summarized in Appendix 2.

Safe and Healthy Workplaces

The panel recommended more research on the impact of culture on occupational safety and health. More in-depth study was recommended to assess the impact on safety culture of hierarchical relationships within selected sub-groups of healthcare workers, staff turnover, temporary/agency staffing, the absence or presence of a "Just Culture," and leaders' behaviors. Length of shift, sleep deprivation, and work to drive adoption of shorter shifts were identified as important. Intervention effectiveness research was suggested to assess the effectiveness of recommendations related to safety culture and sleep patterns. Research was also suggested to evaluate the usefulness of naps as an intervention to improve worker safety. Workplace violence was identified as an important and under-reported problem. Recommendations were made for studies designed to inform a more specific understanding of risk recognition, prevention, and mitigation strategies associated with reducing prevalence of workplace violence.

Much of the recommended research is encompassed within the NIOSH 2019-2023 strategic goals "[Promote safe and healthy work design and well-being](#)" and "[Improve workplace safety to reduce traumatic injuries](#)" ([Appendix 1](#)).

Musculoskeletal Disorders and Patient Mobilization

The panel noted the importance of this area based on the increased prevalence of worker injury in the healthcare sector compared with other industries. The panel made a number of recommendations, particularly to improve translation of known effective interventions for safe patient handling into practice such as use of patient lifting equipment. Implementation science and use of theory-based interventions were recommended areas of study. The study of worker fitness as a resilience strategy, the special needs of aging staff, and the impact of self-care incentives were suggested as potentially important areas of study. The hazards of sitting and sedentary roles and repetitive motion injury from data entry were also mentioned.

Within this group of recommendations, translation/implementation research to improve use of known effective interventions for safe patient handling has been identified as an important HCSA priority. These were not initially included in the NIOSH 2019-2023 strategic goals because there was much effort directed to safe patient handling during the second decade of NORA and because of intramural staff turnover in this area of expertise at the start of the third decade. However, NIOSH has added a goal to explicitly address safe patient handling in response to this recommendation.

Hazardous Drugs and Chemicals

The panel noted the importance of this area and recommended a range of work to improve translation of recommended interventions into practice. The importance of work outside of hospitals, documenting adequacy of personal protective equipment (PPE), and studying male reproductive outcomes were noted. In addition, it was noted that research on the effect of cleaning materials and supplies on healthcare workers may be useful.

These recommendations are encompassed within the NIOSH strategic goals "Reduce occupational cancer, cardiovascular disease, adverse reproductive outcomes, and other chronic diseases," "[Reduce occupational immune, infectious, and dermal disease](#)," and "[Reduce occupational respiratory disease](#)" ([Appendix 1](#)).

Infectious Disease and Sharps

The panel noted the importance of translation/implementation research such as behavioral research to improve adherence to recommendations for preventing transmission of influenza; the importance of documenting uptake of recommendations; and that needlesticks continue to be prevalent in healthcare settings and thus further research regarding effective interventions is needed.

These recommendations are encompassed within the NIOSH strategic goals “[Reduce occupational immune, infectious, and dermal disease](#)” and “[Promote safe and healthy work design and well-being](#)” (Appendix 1).

Panel Summary Recommendations for Possible Future Research Organized by NIOSH Strategic Goals for FYs 2019–2023

In addition to the recommendations already discussed that addressed the four priorities from the second decade of NORA, the panel provided a bulleted list of summary recommendations at the end of their report. Each summary recommendation and NIOSH’s response is presented in the following pages. To maximize their utility, the recommendations and responses that follow are organized according to NIOSH 2019-2023 strategic goal areas ([Appendix 1](#)), with cross-cutting recommendations grouped separately. For each recommendation, we discuss the current relevant NIOSH efforts and initiatives and the relevant activity goals in the NIOSH Strategic Plan.

Strategic Goal 6: Improve workplace safety to reduce traumatic injuries.

Recommendation 1: Workplace violence is an increasing vulnerability within healthcare. The definition is broad and may include horizontal non-physical violence such as bullying, and serious violence that results in severe or permanent physical disability and/or death. More detailed study of specific interventions related to workplace violence and effectiveness strategies stratified by type of violence, may be helpful.

NIOSH addressing at this time: Yes

NIOSH plans to continue conducting workplace violence research in the healthcare sector. In fact, the HSCA Program is currently working to develop occupation-specific violence prevention course units providing relevant information for emergency responders, stand-alone healthcare facilities, and social services/home healthcare providers. An extramural grantee is examining the economic impact of harassment, bullying, abuse, discrimination, and work-family conflict. Furthermore, the Strategic Plan for FYs 2019–2023 includes goals for intervention research for violence prevention in nursing homes and surveillance for violence in home healthcare settings (Activity Goals 6.4.1-6.4.3) [NIOSH 2018B].

Strategic Goal 7: Promote safe and healthy work design and well-being.

Recommendation 2: Evaluation of successful leadership behaviors present during healthy organizational change. Individual workers may not have sufficient influence to change safety culture and workplace policies themselves.

NIOSH addressing at this time: Yes

NIOSH plans to continue to partner with the Joint Commission and OSHA to better understand elements of workplace safety and health culture including leadership behaviors.

The NIOSH Strategic Plan for FYs 2019–2023, recognizing that leadership behaviors and practices have an important role in establishing and maintaining strong workplace safety and health programs, included leadership behaviors as part of its healthcare and social assistance goals. Specifically, in Activity Goals 7.2.1 and 7.2.2 NIOSH is interested in conducting intervention and translation research to better understand how leadership behaviors and practices can reduce work-related infections among nursing aides, home healthcare workers, veterinarians, and animal care workers in mid-to-small healthcare settings [NIOSH 2018b].

In addition, NIOSH has worked with a range of extramural partners to establish an HCSA Sector Council for the third decade of NORA [NIOSH 2018a]. NIOSH is co-chair of this group, providing an important leadership role, and many other organizations contribute time and expertise. The Council has drafted an agenda detailing occupational safety and health research needs for the next decade that identifies safety culture as an important priority [CDC 2018]. In follow up to drafting the agenda, the Council seeks to summarize and promote best practices for achieving strong safety culture in HCSA work settings in a “road map” for the Sector. This effort will build on current efforts to promote safety culture in the HCSA sector and define steps towards implementation. The HCSA Sector Council Safety Culture workgroup will hold a workshop in December, 2018 to become familiar with ongoing efforts of various stakeholders in this area and identify gaps where the Council can make positive contributions.

Recommendation 3: Adequacy of training for all categories of staff, especially those potentially at highest risk due to limited education and/or English as a second language.

NIOSH addressing at this time: Yes

NIOSH is committed to making workplaces safer and healthier for all workers, including those who are vulnerable due to a limited education and/or English as a second language. Many such workers are found in the HCSA industry, particularly in low paying but vitally important areas such as home assistance. NIOSH currently translates many of its publications into multiple languages to reach workers for whom English is a second language and materials are often written at an eighth grade reading level. The [NIOSH en Espanol](#) website has all of NIOSH’s Spanish language materials.

Furthermore, NIOSH plans to continue to move its research into the practice of occupational safety and health through the development of educational and training materials and build upon its early attempts to measure the reach and impact of these efforts.

The NIOSH Strategic Plan for FYs 2019–2023 contains a number of activity goals focused on intervention research; we view training as one of the preventive interventions encompassed within those goals. The description of Intermediate Goal 6.4 on the NIOSH website specifically identifies workers in non-standard work arrangements and vulnerable populations as being a focus of future intervention research in the areas of injury and workplace violence prevention [NIOSH 2018b].

Recommendation 4: Study of cultural behaviors associated with better-than-benchmark worker injury and illness experience rates.

NIOSH addressing at this time: Yes

NIOSH is currently funding research at Columbia University to evaluate 1,600 nurses at 50 U.S. hospitals to look at the relationships between safety climate, standard precaution adherence, healthcare worker blood-borne pathogen exposure and patient healthcare acquired infections. Entitled “[Impact of Safety Climate on Infection Prevention Practices and Healthcare Worker and Patient Outcomes](#),” this study will provide valuable information on the relationship between worker injury and illness rates and safety culture.

The NIOSH Strategic Plan sets goals to assess the impact of safety culture and leadership on health and safety in Intermediate Goal 7.2 and associated activity goals. A study of cultural behaviors associated with better-than-benchmark experience rates could be one approach to this kind of research [NIOSH 2018b]. In addition, as previously noted, the NORA HCSA Sector Council has chosen safety culture as a focus for its activities.

Recommendation 5: The effectiveness of “Just Culture” environments as a tool for improving the likelihood of reporting safety risks and failures may be useful.

NIOSH addressing at this time: No

Many current NIOSH research efforts are focused on improving work culture; however, this work is not specific to “Just Culture” concepts, which parallel the conceptual framework for high-performing organizations [Boysen 2013, TJC 2012]. After a thoughtful assessment of HSCA resources, expertise, and access to partners at this time, NIOSH has determined that it will not actively pursue research specifically focused on “Just Culture,” but will actively pursue research documenting the effectiveness and promoting dissemination of best practices in safety culture as part of the work design and well-being interventions addressed by Activity Goals 7.2.1 and 7.2.1 of the NIOSH strategic plan, which may include elements of “Just Culture.” That said, NIOSH will remain open pursuing this specific topic in the future should there be an appropriate opportunity.

Recommendation 6: Implications of ratios and unintended consequences relative to non-nurse staffing may be important.

NIOSH addressing at this time: No

Currently, there is no specific research being done to look at non-nurse staffing ratios. However, many research projects are focused on non-nurse healthcare workers, which may be able to better characterize issues around adequate staffing, as resources, expertise, and access to partners will allow. The NIOSH Strategic Plan for FYs 2019–2023 includes Activity Goals 7.2.1 and 7.2.2 for intervention and translation research to understand issues around suboptimal work organization. Given the implications of non-nurse staffing ratios may be characterized to some extent in NIOSH studies, NIOSH has determined that it will not actively pursue research projects solely examining this issue at this time, but will remain open to its pursuit in the future should there be an appropriate opportunity.

Recommendation 7: Learned resilience behaviors and potential links to work stress and fatigue.

NIOSH addressing at this time: No

In the past, NIOSH-funded intramural and extramural researchers have conducted research and provided insight into resilience behaviors for other industry sectors and public health preparedness activities for law enforcement and first responders [IOM 2012]. Much of this research focused on resilience among World Trade Center responders [Pietrzak et al. 2014].

Worker resiliency presents a challenge to occupational health researchers as it emphasizes workers' reactions to stress at the individual level instead of addressing root organizational factors that create stressful environments. Individual worker characteristics such as resiliency are important components to consider when evaluating issues of emotional exhaustion, depersonalization, and burnout in the HCSA Sector [Lee et al. 2013], but should be evaluated in relation to the work environment and organizational culture. NIOSH would be interested in pursuing resiliency research as part of an overall strategy to improve organizational culture and the work environment in the HCSA Sector. A joint HCSA/Healthy Work Design and Well-Being goal (7.2.1) calls for intervention studies to develop and assess the effectiveness of work design and well-being interventions to reduce illness among healthcare workers [NIOSH 2018b].

Recommendation 8: Adequacy of healthcare training programs (RN, pharmacist, etc.) with respect to self-care and hazard awareness in the workplace.

NIOSH addressing at this time: No

As previously noted, NIOSH is currently working to develop occupation-specific violence prevention course units providing relevant information for emergency responders, stand-alone healthcare facilities, and social services/home healthcare providers. Part of the project plan is to conduct an evaluation study involving surveys administered before and after taking the course to assess effect on knowledge, attitudes, beliefs, and intent. NIOSH would be interested in pursuing research on the adequacy of healthcare training programs as part of its overall strategy to improve organizational culture and the work environment. As stated above, a joint HCSA/Healthy Work Design and Well-Being goal (7.2.1) calls for intervention studies to develop and assess the effectiveness of work design and well-being interventions to reduce illness among healthcare workers [NIOSH 2018b].

Recommendations that cut across NIOSH Strategic Goals

Recommendation 9: Better knowledge regarding the nature of occupational exposures to hazardous drugs and chemicals in specific health occupations and tasks.

NIOSH addressing at this time: Yes

Moving forward, NIOSH would like to leverage the knowledge it has gained through its research in occupational safety and health practices in healthcare by transferring them to the veterinary and animal care industry within the HCSA sector. Furthermore, NIOSH plans to build upon its initial work related to nurses' exposure to antineoplastic drugs and healthcare worker exposures to cleaning and disinfecting chemicals.

The NIOSH Strategic Plan for FYs 2019–2023 includes a number of goals related to hazardous drugs and chemicals (Intermediate Goals 1.3 and 3.4, along with their associated activity goals). In future fiscal years, NIOSH will continue to support intervention research to evaluate effectiveness of exposure controls such as local exhaust ventilation for hazardous drugs, surgical smoke and waste anesthetic gases, and closed drug transfer systems (Activity Goal 1.3.2). NIOSH also plans to conduct intervention and translation research to understand adherence to safe handling of hazardous drug guidance in a range of work settings such as pharmacies, outpatient clinics, and veterinary clinics (Activity Goals 1.3.2 and 1.3.3). The Strategic Plan also includes goals to conduct surveillance and etiologic research to develop exposure assessment tools for environmental assessment and hazard surveillance (Activity Goals 1.3.1 and 1.3.4). Another healthcare and social assistance research goal focuses on basic research to understand exposure to animal allergens among veterinarians and animal care

workers and continued work to understand the relationship between cleaning and disinfection products and work-related asthma (Activity Goal 3.4.1) [NIOSH 2018b].

Recommendation 10: Evaluation of the adequacy of surveillance of employee exposures to hazardous materials.

NIOSH addressing at this time: Yes

NIOSH continues to develop and improve surveillance of exposures to hazardous materials for workers in the healthcare and social assistance sector. In January 2018, the National Academies of Sciences, Engineering, and Medicine released a report on occupational safety and health surveillance systems. This report specifies several recommendations to improve occupational safety and health surveillance systems, including for hazard surveillance. These recommendations include coordinating surveillance efforts among government, industry, and labor groups, enhancing and improving data collection, utilizing electronic medical records and other sources of data, and improving dissemination of surveillance research [NASEM 2018]. To address these recommendations, NIOSH has convened a group of researchers with expertise in surveillance from across the agency. This group is currently developing plans for implementation.

The NIOSH Health Hazard Evaluation (HHE) program helps employers and employees evaluate for health and safety hazards in their workplace at no cost. These evaluations can provide valuable insight into new and emerging occupational safety and health issues, or identify known safety and health issues that occur in occupational settings not previously associated with those issues. Often HHE's can validate findings from epidemiologic research and surveillance efforts, or identify an issue where more surveillance is needed. The major findings and conclusions of HHEs are [summarized in reports](#).

The NIOSH Strategic Plan for FYs 2019–2023 includes a number of goals focused on improving surveillance of healthcare and social assistance workers. One activity goal is to develop exposure assessment tools for assessing environments for hazardous drugs (1.3.4). This effort could help to identify groups of workers at-risk for inadvertent exposure to hazardous materials. Sharps injury reporting and determining the number of human and animal healthcare exposures to influenza, tuberculosis, and zoonotic diseases have all been identified as important areas for surveillance research (Activity Goal 3.3.4). Basic and etiologic research regarding host susceptibility may also identify workers at risk for infection (Activity Goal 3.3.1) [NIOSH 2018b].

Recommendation 11: Partnerships with large healthcare systems to study education and training curriculum adequacy and impact.

NIOSH addressing at this time: No

Although not the only focus of the project, training is one aspect of a pilot comprehensive “best practices” program in safe patient handling being conducted by the University of Pennsylvania in partnership with intramural NIOSH investigators.

The Strategic Plan includes many research goals focused on intervention research where partnerships with large healthcare systems could be formed, should the opportunity arise. Activity goals focused on interventions include 1.3.2, 3.3.2, 3.4.2, 5.4.2, 6.4.2, and 7.2.1 [NIOSH 2018b].

Recommendation 12: Evaluation of worker safety in healthcare settings outside of acute and long-term care.

NIOSH addressing at this time: Yes

NIOSH is continuing its work in homecare settings and increasing its work with dental personnel, including meeting with the American Dental Association (ADA) to address the emerging issue of risk for idiopathic pulmonary fibrosis among dental personnel. Based on the importance of this emerging issue, we are developing new goals for the NIOSH Strategic Plan to address interstitial and fibrotic lung disease in dental personnel.

Veterinarians, veterinary technicians, and other animal care workers are a population of concern in the healthcare and social assistance sector. In fact, NIOSH and its grantees plan to begin or continue examining occupational stressors in veterinary practice [Vande Griek et al. 2018], analyzing all-cause mortality among U.S. veterinarians, and transferring occupational safety and health practices used in human healthcare to veterinary and animal care. The NIOSH Strategic Plan for FYs 2019–2023 includes a number of goals related to workers in other healthcare settings. These activity goals include developing hazardous drug controls in outpatient clinics and pharmacies (1.3.2), evaluation of work-related stress and fatigue in home healthcare settings (1.4.1, 7.2.1, 7.2.2), identification and isolation of tuberculosis patients in urgent care clinics (3.3.1), and understanding injury risk factors in home health settings (6.4.1 and 6.4.3). In addition to human healthcare settings, the Strategic Plan also includes veterinary and animal care settings with activity goals to reduce hazardous exposures (1.3.1-1.3.4) and address adverse outcomes related to suboptimal work organization (1.4.1, 7.2.1-7.2.3), healthcare associated infections (3.3.1-3.3.4), and injuries (6.4.1) [NIOSH 2018b].

Recommendation 13: Effectiveness of existing regulations.

NIOSH addressing at this time: Yes

NIOSH has planned and current efforts to examine the effectiveness of regulations in areas such as safe patient handling and workplace violence prevention. NIOSH intramural investigators have worked in this area [Ridenour et al., 2017] and NIOSH-funded grantees have examined this issue at the state level [Lapane et al. 2016, Walton et al. 2017]. As noted earlier, we have added an intermediate goal and activity goals to the NIOSH strategic plan that specifically address patient handling. Evaluating the existing state laws is explicitly included in this goal.

Recommendation 14: Implementation studies to determine how best to translate interventions into practice. This should include identifying facilitators of and barriers to workers' adherence to guidelines and best practices, and evidence-based innovations to address those barriers and increase adherence.

NIOSH addressing at this time: Yes

Compared with other workplace safety and health efforts, translation research is a relatively new field. To foster engagement in this important area, NIOSH established a Translational Research Program in 2016 [NIOSH 2018c]. Currently, the Institute is supporting several relevant research efforts in the HCSA sector. An extramural grantee is working to help hospitals identify best practices in personal protective equipment management during both routine and emergency operations in part by benchmarking against other hospitals. In another example, intramural NIOSH investigators working with investigators from other parts of CDC have documented the impact of various interventions on healthcare workers' adherence to influenza vaccination recommendations [Black et al., 2017]. Another intramural investigator is working in partnership with the University of Pennsylvania to translate best practices for safe patient handling through a best practices program. The NIOSH 2019-2013 strategic plan contains a number of activity goals focused on translation research including 1.3.3, 3.3.3, 3.4.3, 5.4.3, and 7.2.2.

Recommendation 15: There appears to be absence of study about human factors and high reliability science. This area of study has been useful in preventing inadvertent patient harm, and there may be benefit to studying this area of science as it relates to worker safety.

NIOSH addressing at this time: No

As noted in the response to Recommendation 5, we agree that the conceptual frameworks for “Just Culture” and high reliability organizations are extremely important in the HCSA Sector. See response to Recommendation 5 for details.

Recommendation 16: Much of the past research is focused on nurses. There is an opportunity to study the many other providers in the healthcare environment.

NIOSH addressing at this time: Yes

NIOSH agrees it is important to address the occupational safety and health needs of many types of HCSA workers. Much current and recent work has looked at home healthcare workers because of the unique hazards faced by this important and growing segment of the HCSA Sector. Examples include externally funded research looking at the risks posed by cleaning and disinfection products in the homecare setting.

The NIOSH Strategic Plan for FYs 2019–2023 includes a number of goals related to healthcare and social assistance workers besides nurses. This includes evaluating work related stress, anxiety, depression, and fatigue among environmental service workers (1.4.1), hazardous drug exposures among pharmacists (1.3.2 and 1.3.3), preventing infectious disease transmission among all healthcare workers especially long-term care, home care, and VM/AC workers (3.3.2, 3.3.3, 3.3.4), addressing work-related asthma in all healthcare workers, including environmental service workers, respiratory therapists, and VM/AC workers (3.4.1, 5.4.1, 5.4.2, 5.4.3, 5.4.4), addressing injuries in home healthcare, nursing home, and VM/AC workers (6.4.1, 6.4.2, 6.4.3), and addressing work organization issues in all healthcare workers, including VM/AC workers, vulnerable populations, home healthcare workers, social assistance workers, and medical residents (7.2.1, 7.2.2, 7.2.3) [NIOSH 2018b].

Recommendation 17: Anthropological research regarding observed vs. reported work behaviors and links to worker safety.

NIOSH addressing at this time: Yes

We agree that evaluating baseline behaviors and changes in behaviors in response to interventions is an important component of intervention research (Activity Goals 1.3.2, 3.3.2, 3.4.2, 5.4.2, 6.4.2, 7.2.1) and translation research (Activity Goals 1.3.3, 3.3.3, 3.4.3, 5.4.3, 7.2.2) and that important lessons can be gleaned from comparing reported work behaviors vs. observed actual work behaviors. An example of [a NIOSH-funded extramural study](#) collecting this information is one comparing self-reported and observed standard precaution adherence in relation to safety culture. We will encourage collection of this information in appropriate interventional and translational research projects.

Recommendation 18: Evaluation of interactive and digital platforms (game-based learning) for knowledge acquisition and translation into practice.

Recommendation 19: Simulation is not a prevalent area of study with regard to impact and perhaps worthy of further review.

NIOSH addressing at this time: No (Combined response to recommendations 18 and 19)

We agree that game-based learning and simulation have the potential to be used to address a variety of occupational safety and health issues in the HCSA sector. NIOSH is currently funding research looking at home healthcare hazard training through virtual simulation [Polivka et al. 2015, Darragh et al. 2016, Wills et al. 2016]. Part of this research has involved creating a virtual, game-based environment [Darragh et al. 2016].

Although NIOSH does not have an intramural healthcare simulation unit, we have met with several academic medical centers to tour their simulation units and have established there is potential for NIOSH intramural investigators to gain access through partnership. Even so, based on analysis of current resources and needs, NIOSH will not specify the approaches of game-based learning and simulation as priorities. However, should the opportunity arise, we will be willing to consider pursuing projects involving these approaches under translational research goals such as safe handling of hazardous chemicals and drugs (1.3.3), preventing transmission of work-related infectious disease (3.3.3), preventing exposures to aerosolized medications (3.4.2), addressing allergen and irritant exposures (5.4.2), preventing injuries due to violence (6.4.2), and improving work design and well-being (7.2.2).

Recommendation 20: Expanding and acknowledging the partnership of labor unions in future documents. Labor unions have actively participated in HCSA work by providing NIOSH access to at-risk populations; helping frame the “real-world” environment for researchers; advocating for implementation of recommended guidelines with employers; advocating for regulation adoption, including findings as part of collective bargaining; and sharing NIOSH findings at various settings, such as state, local and national labor federation events.

NIOSH addressing at this time: Yes

NIOSH strongly values its relationships with all its stakeholders, including labor, management, academics, governmental partners, and others. It is only by working with a broad range of partners with a broad range of perspectives and disciplinary backgrounds that we can achieve our shared goal of safer, healthier workers.

That said, labor is a very important partner in addressing occupational safety and health issues in the HCSA sector. An example of ongoing intramural research conducted in partnership with a union is a study evaluating risk factors for asthma among union members who are HCSA workers. NIOSH has also worked closely with unions and other stakeholders to address disease outbreaks potentially affecting healthcare workers, such as the 2009 H1N1 influenza pandemic. Union representatives are key members of the HCSA NORA Sector Council and are actively involved in Council activities. We strongly welcome new and expanded partnerships with labor and other interested partners to improve occupational safety and health in the HCSA sector.

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Appendix 1: HCSA Component of NIOSH's Fiscal Year 2019-2023 Strategic Plan

NIOSH recently developed a Strategic Plan for Fiscal Years 2019-2023 [NIOSH 2018B]. The HCSA component of the plan was developed through facilitated meetings between the HCSA Program and various other NIOSH programs, including seven health and safety cross-sector programs [NIOSH 2018B]. Key considerations for identification of priorities for the strategic plan were burden of the issue addressed (morbidity, mortality, frequency of exposure, economic burden, etc.) and need for NIOSH to do work in the area (potential to reduce burden, stakeholder demand, match with NIOSH expertise and resources, etc.). The resulting NIOSH strategic plan is presented as a 10x7 program grid crossing the needs of 10 industry sectors with those of the 7 health and safety cross-sectors [NIOSH 2018B]. This strategic plan will play an important role in guiding decisions about expenditure of intramural and extramural resources during fiscal years 2019-2023.

The goals from the NIOSH strategic plan addressing the HCSA sector are as follows:

Strategic Goal 1: Reduce occupational cancer, cardiovascular disease, adverse reproductive outcomes, and other chronic diseases.

- **Intermediate Goal 1.3:** Cancer and adverse reproductive outcomes. Employers, workers and manufacturers use NIOSH information to reduce hazardous exposures that contribute to cancer and adverse reproductive outcomes among healthcare and social assistance workers.
 - Activity Goal 1.3.1 (Basic/Etiologic Research): Conduct basic/etiologic research to better assess relationships between level of exposure and risk for cancers and adverse reproductive outcomes in healthcare and social assistance.
 - Activity Goal 1.3.2 (Intervention Research): Conduct studies to develop and assess the effectiveness of interventions to prevent exposures to hazardous drugs and other chemicals linked to cancers and adverse reproductive outcomes among healthcare and social assistance workers.
 - Activity Goal 1.3.3 (Translation Research): Conduct translation research to understand barriers and aids to implementing best practices for the safe handling of hazardous drugs and other chemicals linked to cancers and adverse reproductive outcomes among healthcare and social assistance workers.
 - Activity Goal 1.3.4 (Surveillance Research): Conduct surveillance research to develop new tools and methods for assessing the burden of work-related exposures to carcinogens among healthcare and social assistance workers.
- **Intermediate Goal 1.4:** Work organization and cancer, CVD. Employers and workers use NIOSH information to mitigate the effects of work organization to help prevent cancer and cardiovascular disease among healthcare and social assistance workers.
 - Activity Goal 1.4.1 (Basic/Etiologic Research): Conduct basic/etiologic research to better understand the relationship between work organization and cancers, and work organization and cardiovascular disease, in healthcare and social assistance.

Strategic Goal 3: Reduce occupational immune, infectious, and dermal disease.

- **Intermediate Goal 3.3:** Infectious disease transmission. Employers, workers, professional associations, and manufacturers use NIOSH information to prevent the transmission of pathogens, including drug-resistant organisms, among workers in human and veterinary healthcare settings.
 - Activity Goal 3.3.1 (Basic/Etiologic Research): Conduct basic/etiologic research to better understand influenza aerobiology and transmission in healthcare settings and develop improved approaches to rapidly identify patients with active tuberculosis.

- Activity Goal 3.3.2 (Intervention Research): Conduct studies to develop and assess the effectiveness of interventions to prevent transmission of work-related infectious disease among workers in human and veterinary healthcare settings.
- Activity Goal 3.3.3 (Translation Research): Conduct translation research to understand barriers to implementation and aid in implementation of best practices for preventing the transmission of work-related infectious disease in human and veterinary healthcare settings.
- Activity Goal 3.3.4 (Surveillance Research): Conduct surveillance research to evaluate and track the burden of work-related infectious disease among workers in human and veterinary healthcare settings.
- **Intermediate Goal 3.4:** Exposures related to asthma and other immune diseases. Employers, workers, professional associations, and others use NIOSH information to prevent chemical exposures that contribute to immune diseases among healthcare and social assistance workers.
 - Activity Goal 3.4.1 (Basic/Etiologic Research): Conduct basic/etiologic research to better characterize exposures to hazardous chemicals and understand the relationship between hazardous exposures and immune diseases among healthcare and social assistance workers.
 - Activity Goal 3.4.2 (Intervention Research): Conduct studies to develop and assess the effectiveness of interventions to prevent exposures to aerosolized medications linked to immune diseases among healthcare and social assistance workers.
 - Activity Goal 3.4.3 (Translation Research): Conduct translation research to understand barriers and aids to implementing best practices regarding cleaning agents and disinfectants linked to immune diseases in healthcare and social assistance workplaces.

Strategic Goal 5: Reduce occupational respiratory disease.

- **Intermediate Goal 5.4:** Work-related asthma. Employers, workers, professional organizations, medical educators, researchers, and policy-makers use NIOSH information to reduce work-related asthma among healthcare and social assistance workers.
 - Activity Goal 5.4.1 (Basic/Etiologic Research): Conduct basic/etiologic research to better understand relationship between occupational exposures and work-related asthma among healthcare and veterinary medicine/animal care workers.
 - Activity Goal 5.4.2 (Intervention Research): Conduct studies to develop and assess the effectiveness of allergen and irritant exposure interventions to reduce work-related asthma among healthcare and veterinary medicine/animal care workers and foster asthma-friendly workplaces in healthcare.
 - Activity Goal 5.4.3 (Translation Research): Conduct translation research to understand barriers and aids to implementing effective engineering controls for surgical smoke to reduce work-related asthma in healthcare worksites.
 - Activity Goal 5.4.4 (Surveillance Research): Conduct surveillance research to explore utilizing existing data sources to better understand exposures and asthma morbidity/mortality among healthcare workers.

Strategic Goal 6: Improve workplace safety to reduce traumatic injuries.

- **Intermediate Goal 6.4:** Injuries caused by patients (human and animal). Employers, workers, and professional associations use NIOSH information to prevent injuries among high-risk healthcare and social assistance workers.
 - Activity Goal 6.4.1 (Basic/Etiologic Research): Conduct basic/etiologic research to better understand the burden of non-fatal injuries in healthcare and social assistance and associated risk factors, particularly in home healthcare and veterinary/animal care.
 - Activity Goal 6.4.2 (Intervention): Evaluate the effectiveness and cost-effectiveness of interventions designed to prevent injuries due to violence among nursing home workers.

- Activity Goal 6.4.3 (Surveillance Research): Identify new or improved surveillance methods, sources or tools to determine the burden of injuries (including violence) to home healthcare workers.

Strategic Goal 7: Promote safe and healthy work design and well-being.

- **Intermediate Goal 7.2:** Work organization. Employers, workers, professional and labor organizations, medical educators and accrediting bodies use NIOSH information to improve occupational safety and health through work design in the healthcare and social assistance sector.
 - Activity Goal 7.2.1 (Intervention Research): Conduct intervention studies to develop and assess the effectiveness of work design and well-being interventions to reduce injuries and illness among healthcare workers.
 - Activity Goal 7.2.2 (Translation Research): Conduct translation research to understand barriers and aids to implementing effective work design and well-being interventions among healthcare workers.
 - Activity Goal 7.2.3 (Surveillance Research): Conduct surveillance research to better track work practices, work factors (psychosocial and safety climate), and health and safety outcomes among healthcare workers, including those in contingent work arrangements and VM/AC workers.

Appendix 2: Specific Recommendations Arising from Panel's Retrospective Review of Four Priority Areas from the Second Decade of NORA

Safe and Healthy Workplaces (from pages 12- 14 of panel report)

- Impact of hierarchal relationships within selected sub-groups of healthcare workers
- Impact of staff turnover and temporary/agency staffing
- Impact of absence or presence of a "Just Culture"
- Impact of leaders' behaviors associated with improved safety culture
- Study of length of shift and sleep deprivation. Despite overwhelming evidence, shifts routinely scheduled to exceed 8 hours are an industry norm. It is important to drive meaningful change in adoption of shorter work shifts
- Workplace violence is chronically underreported and an accurate knowledge of prevalence may be of value - specifically, studies designed to inform a more specific understanding of risk recognition, prevention and mitigation strategies associated with reducing prevalence
- More research to demonstrate intervention effectiveness
- Determine how NIOSH products are used and if the use is contributing to worker safety or if it has been translated into policy, etc.
- Add a survey component, to be completed upon download of NIOSH materials, to gather user demographic information
- The impact of naps on worker safety requires clarification as some research is showing naps to be effective, but sleeping is generally not permitted in the workplace
- It would be of value to understand whether achievement of OSHA Voluntary Protection Program (VPP) designation reliably impacts workplace environment with respect to injury and illness prevention
- Considerable research has been conducted using valid instruments that assess safety culture and climate. These could likely be applied to the study of worker safety as well as other environmental factors associated with positive worker safety outcomes
- "Push" notifications of web training to healthcare leaders via state associations or other vehicles may increase utilization and thus translation to practice
- Many vendors produce high quality worker safety tools and training currently utilized by healthcare facilities. There may be an opportunity for partnership that could extend the reach of NIOSH resources

Musculoskeletal Disorders and Patient Mobilization (from pages 15 -16 of panel report)

- Research regarding hazards of sitting/sedentary roles and developing best practice recommendations for sit-to-stand working may be an important area of interest
- Research on repetitive motion injuries, particularly with the proliferation of electronic data entry and mobile computer carts within the healthcare sector, may be of value. There is limited study of which interventions are most effective and most readily adopted by workers
- In the field, training is prevalent, but there is no strong evidence that the training improves adherence to guidelines/best practices
- Translation research to enhance adoption of NIOSH research (four example on use of patient lifting equipment) into practice and thus reduce injury. Examples might be to evaluate administrative controls such as requiring the use of lifting equipment, and evaluate how to most effectively increase accurate, consistent, and ongoing use of this equipment by healthcare staff
- Develop theory-based interventions and conduct research to provide evidence-based guidance using theoretical frameworks to evaluate how to best implement the interventions that are found to be effective. The panel notes that the area of musculoskeletal injury prevention seems ripe for this type of

research and recommends conducting more studies similar to the study described in the Evidence Package that identified factors that influence the use of patient lift equipment by healthcare staff

- Study worker fitness as a resilience strategy
- Study the special needs of aging staff
- Study the impact of self-care incentives

Hazardous Drugs and Chemicals (from pages 17 – 18 of panel report)

- Simple labeling intervention opportunities to address risk of chemotherapy medications on the outside of vial
- Study impact on reproductive health of male as well as female healthcare workers.
- Promote more NIOSH health hazard evaluations in this area
- “Push out” NIOSH publications and guidance documents to improve awareness and thus adoption.
- Settings outside of hospitals, particularly those with minimal regulatory impact, may be especially risky for workers (e.g., provider offices, ambulatory centers).
- Study of adequacy of PPE such as chemo gloves. Additional product evaluation may be a valid area of research.
- The Institute for Safe Medication Practices (ISMP) is the expert resource on medication management for the healthcare industry and may be a strong partner for NIOSH to consider.
- Research on the effect of cleaning materials and supplies on healthcare workers may be useful.
- Actively disseminate research demonstrating the lack of universal adherence to safe handling guidelines.
- Conduct research on how to increase adherence, for example use of personal protective equipment in use of hazardous drugs. Address barriers to workers’ adherence to guidelines and best practices.
- Use the Health Hazard Evaluation (HHE) Program to translate research into practice.

Infectious Disease and Sharps (pages 20-21)

- Gather data on the usage of products developed on guidance for use of PPE to protect against Ebola and the impact on adoption of best practices, for example on hospital policies.
- Conduct behavioral research relevant to adherence to guidelines and best practices to reduce the transmission of preventable infectious diseases to healthcare workers.
- Fund translation/implementation research in the future.
- Evaluate adherence to crucial skills and behaviors such as correct use of PPE
- Needle sticks continue to be very prevalent in healthcare settings and thus, worthy of further research regarding effective interventions