NIOSH Traumatic Injury Research Program

Monitoring Progress in Implementing the National Academies' Program Evaluation Recommendations: *A Report to the NIOSH Board of Scientific Counselors*

August 2012

Updated August 2014

Introduction

The National Institute for Occupational Safety and Health (NIOSH) Traumatic Injury (TI) Research Program underwent a systematic review for relevance and impact by the National Academies (NA) beginning in 2007. The NA concluded in their 2009 report[1] that the Program conducted research "in priority areas and led to demonstrated effects on some end outcomes or on well-accepted intermediate outcomes." On the basis of a scale of 1 (low) to 5 (high), the NA assigned the Program scores of 4 for both relevance and impact. The NA offered nine overarching recommendations for improvement that encompassed strategic planning, coordination and collaboration, workforce development, transfer activities, and the changing nature of work.

In 2009, the TI Research Program developed a draft implementation plan that included revisions to the TI Strategic Plan. The draft implementation plan was presented to the NIOSH Board of Scientific Counselors (BSC) and posted to the NIOSH docket for public comment. No public comments were received. The implementation plan[2] was finalized in 2010 reflecting BSC comments and recommendations.

Although work and progress continues on all of the NA recommendations, this document reports the Program's progress in implementing five selected recommendations. The five recommendations were selected because of their potential to enhance the relevance and impact of the Program and the ability to address future emerging traumatic injury issues. The five selected recommendations encompass strategic planning, coordination and collaboration, and the changing nature of work. Appendix A includes brief updates and comments on the four NA recommendations not addressed in this document.

The TI Research Program encompasses intramural and extramural research. Much of the intramural research is conducted in the Division of Safety Research (DSR) which serves as the focal point within NIOSH for traumatic injury research. However, considerable traumatic injury research is conducted in other NIOSH Divisions, Laboratories and Offices (DLOs) and extramurally. The Program is overseen by a Program Manager who is also the DSR Director. The Program Manager relies on the multidisciplinary TI Steering Committee with representation from all DLOs conducting traumatic injury research, including the Office of Mining Safety and Health Research and the Office of Extramural Programs (OEP), to ensure that the Program addresses all high-risk industry sectors, is reflective of the breadth and richness of NIOSH expertise, and encompasses extramural research.

When the TI Research Program was evaluated by the NA in 2007, mining research was specifically excluded from the review because the intersecting Mining Program had recently undergone a separate NA review. Therefore, for the purposes of this progress report, projects and activities that are solely focused on the mining industry and associated impacts are excluded. However, activities illustrating linkages with the Mining Program are included.

2014 Update

This 2014 update continues the process of programmatic review and continuous improvement for NIOSH programs previously reviewed by the NA. These reviews, conducted by the BSC, are the basis for a NIOSH Government Performance and Results Act (GPRA) performance measure. The 2012 BSC review of the TI Research Program's progress in implementing selected NA recommendations can be found in Appendix B. The BSC scored the TI

Program's progress on each of the five selected recommendations in areas of Relevance, Sustainability, Progress, and Potential for Impact. The TI Program received a summary score of 4.4 (on a scale of 1 to 5, with 5 being highest).

This 2014 update and progress review is for the same five selected NA recommendations reviewed in 2012, and is responsive to both the 2009 NA recommendations and the 2012 BSC review comments. For this update report, sections have been added to the original 2012 report and labeled as 2014 Updates. Updates are provided for the time period since the last review (September 2012 to August 2014) on: additions or modifications to activities, progress made, impacts, and future plans.

References that have been added to this report for the 2014 update have been incorporated into the original 2012 reference list, appearing in the Reference section in the order in which they occur in this expanded report. New references are labeled with an alphanumeric combination (e.g. 8A). Additionally, an acronym list has been added and can be found in Appendix C.

Monitoring Implementation of Selected Recommendations

(Note: the recommendation numbers refer to those used in the NA report.)

Recommendation 1

Continue setting goals that are within the TI Research Program's scope and resources. Given its limited resources, the TI Research Program should continue a research focus and priority-setting on goals that are well-defined, are based on rigorous surveillance data, and are complementary to work being done by stakeholders, extramural research partners, or other agencies.

Background

Status

In progress

External Factors

Occasionally congressional directives or unanticipated requests from other government agencies can result in TI Research Program resources being directed to activities that are not Program priorities or explicit in the TI Strategic Plan goals. As a current example, in response to requests from the US Department of Agriculture (USDA) Food Safety Inspection Service (FSIS) and the Occupational Safety and Health Administration (OSHA), the Program is participating in a multi-year Health Hazard Evaluation (HHE) that is assessing the impact of increased poultry processing line speeds on worker safety. Though not encompassed per se in the TI Strategic Plan, it was important for the Program to be responsive to this request and to help illuminate the worker safety implications of a proposed USDA rule[3] that would allow dramatic increases in line speed.

Implementation of Recommendation

Activity: Periodic Revision of the TI Strategic Plan and Goal Prioritization

Description

The TI Strategic Plan serves to focus Program activities in directions that are likely to advance the Program's mission. The Plan provides guidance to NIOSH intramural and extramural scientists when conceptualizing and planning research projects and activities, helps management make informed decisions about the direction of the Program given finite resources, and facilitates coordination of programs within the NIOSH portfolio. To ensure that the Plan stays current and relevant, it is periodically revised and input is sought from extramural researchers and stakeholders.

The TI Strategic Plan encompasses Intermediate and Activity/Output Goals across 6 Strategic Subgoals. To maintain a strategic plan that addresses a reasonable breadth of traumatic injury research needs, while also ensuring progress on gaps and concentrated activities that can lead to measurable improvements in worker safety, the TI Research Program periodically prioritizes goals and activities. Factors that are considered in prioritizing goals include: the magnitude or

emergence of a problem as evidenced by data; the breadth of the TI Research Program portfolio and gaps; the immediacy of need expressed by OSHA or other critical stakeholders; and the momentum of TI research on the course of research to practice.

Progress

The TI Strategic Plan, developed in 2007 for the NA review, was revised in 2009 based on NA and BSC review, including the addition of a sixth goal on surveillance.[2] Although the 2009 TI Strategic Plan was posted on the NIOSH website and a docket was opened for public comment, no comments were received.

The 2009 TI Strategic Plan is currently being revised by interdivisional multidisciplinary workgroups addressing each of the six Strategic Subgoals: 1) fall prevention, 2) motor vehicle safety, 3) violence prevention, 4) machine and industrial vehicle safety, 5) high risk and vulnerable worker groups, and 6) surveillance. The workgroups are comprised of TI Steering Committee members complemented by staff across the Institute with relevant expertise. Workgroups are considering several inputs and factors, including: injury surveillance data; data and evidence of the changing nature of work; progression of research along the public health framework; progress on goals and activities by NIOSH, extramural researchers, other government agencies and stakeholders; and NIOSH capacity, expertise, and resources. An emphasis is being placed on goals with the greatest potential for impact, such as those that include Prevention through Design (PtD) principles and intervention evaluations. A specific objective of the current revision process is to develop a strategic plan that is more concise and focused with fewer goals overall.

Beginning in 2010, the TI Research Program and other NIOSH Programs began prioritizing goals to focus new research proposals and activities. Among the priority goals identified by the TI Research Program were goals focused on motor vehicle safety. These goals were prioritized based on an assessment that the Program was inadequately addressing this leading cause of work injury death which spanned all industry sectors. In addition to prioritizing motor vehicle safety goals, NIOSH established a virtual Center for Motor Vehicle Safety[4] in December 2010 to help focus and garner interdivisional research on motor vehicle safety. Between 2009 and 2012, the TI Research Program has undertaken 32 projects that address motor vehicle safety goals. These projects are conducted in 7 NIOSH DLOs and extramurally. The projects span the research spectrum from surveillance, to risk factor identification, to intervention development and evaluation (including engineering controls), to transfer of research results to change practice. The projects address multiple at-risk worker populations, including truck drivers, fire fighters, emergency medical services workers, police, roadway construction workers, agricultural workers, oil and gas workers, and home healthcare workers.

Impact

Periodic revisions will help ensure that the TI Strategic Plan is focused and commensurate with surveillance data, the evolving evidence-base of science, the changing nature of work, and NIOSH resources. Actively seeking input from extramural researchers and stakeholders will help ensure that the Plan recognizes progress made outside of NIOSH, and that the Plan and resultant research findings and products will be relevant to stakeholders who are critical in advancing NIOSH research into practice.

The potential impact of prioritizing goals and activities is illustrated by the considerable impacts in motor vehicle safety research in a short timeframe. Prioritizing motor vehicle safety

goals and establishing the virtual NIOSH Center for Motor Vehicle Safety have contributed to numerous examples of others acting upon our research and recommendations (Intermediate Outcomes in NA terminology). These Intermediate Outcomes range from development of standards and policies at the international and national levels to changes in practice at the employer level. The following are selected examples:

- The United Nations' (UN) General Assembly proclamation, *Decade of Action for Road Safety 2011-2020,*[5] makes specific reference to occupational road safety which has the potential to lead to improvements in worker road safety within the United States and globally. TI Program staff participate on the UN Road Safety Collaboration, conveying findings from our research.
- The forthcoming International Organization for Standardization (ISO) standard, *Road Traffic Safety Management Systems – Requirements with Guidance for Use*, emphasizes public and private sector organizations as a key road user group within a comprehensive framework for ensuring the safety of the entire road system. TI Program staff serve on the US committee for this important activity.
- The American National Standards Institute (ANSI) standard, *Safe Practices for Motor Vehicle Operations,* was revised in 2012[6] with considerable TI Program input. The revision includes strengthened safety-belt provisions, and new or expanded sections on journey management, impaired driving, and fatigue management. This standard is important because it provides guidelines for the safety of employees who drive for work, but who are not covered by the federal regulations that are applicable only to the operation of large trucks and buses.
- Several truck manufacturers are currently using Program-collected anthropometric data on truck drivers to improve the safety and ergonomics of the next generation of truck safety cabs.[7] Manufacturers who have been provided access to these data and technical assistance include Freightliner, Volvo Trucks, and Daimler Truck North America.
- NIOSH surveillance grantees have contributed to informed public and employer policy, revised trucking regulations, improved highway safety planning and enforcement, and training tools. As one example, findings from fatality investigations conducted in Kentucky contributed to trucking companies adopting restraint systems for sleeper berths and personnel policies to mitigate driver behavioral factors.[8]

Future Plans

The TI Research Program is working toward finalizing revisions to the TI Strategic Plan by early 2013. The Program anticipates posting a draft revision to the NIOSH website in the fall of 2012, and actively seeking review and input to a NIOSH public docket. The opportunity to provide input on the Plan will be announced through the NIOSH E-News, and notices will be sent to the more than 100 extramural attendees at the 2011 National Occupational Injury Research Symposium (NOIRS) and to the Consortium of Occupational State-based Surveillance listserv that includes state occupational public health programs. Review and input will also be sought from agencies that regulate worker safety (e.g. OSHA and Department of Transportation (DOT)) to foster alignment of the Plan with research needs of regulatory agencies.

The TI Research Program will continuously monitor the relevance of the Strategic Plan and formally review and revise the Plan at least every 3 years, with the next revision planned for 2015. The Program will continue to collect rigorous surveillance data to monitor and ensure the relevance and potential impact of Plan revisions.

The Program will continue to prioritize motor vehicle safety research in the near-term and anticipates periodic prioritization of other goals in the future to fill gaps in the TI Research Program portfolio, to ensure focused research that is likely to contribute to improvements in worker safety, and to see research through to practice.

2014 Update

Addition of or Modifications to Activities since Last Review

No additions or modifications.

Progress Made or Maintenance Efforts since Last Review

Strategic Plan Revision: The six interdivisional multidisciplinary workgroups (one for each of the Strategic Subgoals) proposed revisions to the TI Strategic Goals. Each workgroup included subject matter experts from a variety of disciplines including surveillance, epidemiology, engineering, and organizational psychology. Inputs considered by the workgroups included surveillance data, an inventory of TI research by goals, and relevant work being done by stakeholders, extramural research partners, or other agencies.

Workgroups were charged with prioritizing existing strategy, retiring completed goals or those judged to no longer be a priority, and identifying new goals and filling research gaps. The approach was consistent with the Nominal Group Planning technique, which is creative, participatory, and democratic. Teams identified existing goals' strengths and weaknesses, opportunities for new work and revisions to existing goals, variables that might prevent success, and evidence sufficient to consider a goal met. The teams were also directed to draft goal-specific Performance Measures. TI Research Program leadership reviewed proposed revisions as a whole and worked with the six workgroups to foster cohesive and coordinated approaches across the six Subgoals, to identify when other agencies and partners should be explicitly identified in goals, and to ensure an emphasis on goals with the greatest potential for impact, such as those that include Prevention through Design (PtD) principles and intervention evaluations.

In Spring 2013, proposed revisions to the Traumatic Injury Strategic Subgoals were posted for public comment. The opportunity to provide comment was broadly solicited and disseminated via multiple sources and media platforms, including: NIOSH E-News, extramural attendees to NOIRS 2011, the Consortium of Occupational State-based Surveillance listserv, NIOSH Education and Research Center (ERC) directors, key partners (American Society of Safety Engineers [ASSE], National Safety Council [NSC], and National Fire Protection Agency [NFPA]), and other federal agencies (Bureau of Labor Statistics [BLS], Bureau of Justice Statistics, National Institute of Justice, National Center for Injury Prevention and Control [NCIPC], the Occupational Safety and Health Administration [OSHA], Consumer Product Safety Commission [CPSC], Federal Motor Carriers Safety Administration [FMCSA], National Highway Traffic Safety Administration [NHTSA], Federal Transit Administration [FTA], US Fire Administration [USFA], and Department of Homeland Security). Sixteen sets of comments were received from various stakeholders, including external researchers, ERC directors, NCIPC, BLS, ASSE, NSC, and NFPA, helping to ensure that goals were relevant.[8A]

The revised goals reflect input from internal and external experts and stakeholders, progress made since the goals were first established, and emerging issues. Revisions include:

- Retiring goals that had been achieved (e.g. sub-Activity/Output Goal 2.2.2.1: Make available blind area diagrams for selected construction vehicles and equipment used in the road construction industry), or were deemed to no longer be a priority (e.g. Activity/Output Goal 1d.2.4: Develop hazard assessment checklists for use by the food services industry to identify the most common slips, trips and falls hazards);
- New goals as new priorities were identified through surveillance data and/or research progress (e.g. Strategic Subgoal 3d: Identify prevention strategies and effective interventions to prevent workplace violence by socio-demographic characteristics, such as sex, age, race/ethnicity, or national origin); and
- Revising goals to more explicitly address issues encouraged by stakeholders (e.g. Activity/Output Goal 2.1.1: adding "distracted driving" as an example risk factor).[8B]

To keep the agenda within the Program's scope and resources, some reviewers' suggestions were not acted upon, such as adding other causes (e.g. struck-by injuries), types (e.g. eye injuries), and secondary and tertiary prevention.

As part of the development of a plan for each Subgoal, Performance Measures for Activity/Output Goals were added to aid in assessing progress to goal completion; more detail is provided in response to Recommendation 2 (p. 12).

Goal Prioritization: The Traumatic Injury Steering Committee continued to prioritize goals for intramural research. Priorities were selected based on surveillance data indicating the current state of work-related traumatic injury, the expertise of intramural researchers positioned to propose new projects, intramural laboratory capacity, mutual interests with other NIOSH programs, and an intent to keep priorities in place for a period of time to allow the research portfolio in that area to grow and increase the likelihood of impact. Consistent with all NIOSH programs, three goals were prioritized for intramural research each year at the Intermediate or Activity/Output Goal level, and new intramural research proposals were required to address a priority goal. In the past few years, two goals were consistently identified as intramural priorities: 1) motor vehicle intervention evaluations, to continue to expand the research portfolio in this area and increase potential for impact; and 2) risk factor and intervention evaluation research among high-risk populations, to foster research integrated with sector programs which fit the definition of high-risk (groups with injury rates that exceed the average for all workers and/or are increasing over time, e.g. Construction, Mining). For Fiscal Year (FY) 2015, a goal to conduct risk factor and intervention research on machine safety was prioritized to integrate with other NIOSH programs (e.g. several sectors and the Engineering Controls Cross-Sector) and capitalize upon internal research expertise and laboratory capacity.

In 2014, NIOSH began prioritizing three to five goals per sector and among some cross-sectors for extramural research. The intent was to communicate broad priorities to extramural researchers that could be considered in internal programmatic funding decisions. Different from intramural goals, extramural priority goals are at the Strategic Subgoal level to ensure broad latitude in investigator-initiated proposals. Extramural researchers are encouraged, but not required, to address priority goals. The Traumatic Injury Steering Committee identified all but the Surveillance Subgoal as priority areas for extramural research. (The latter was not identified as a priority because of a long-standing cooperative agreement program that has contributed to a rich portfolio in surveillance activities by the extramural community.) Other Traumatic Injury Strategic Subgoals have not consistently been highlighted in extramural funding opportunities.

While goal prioritization helps build up the Traumatic Injury portfolio in some areas, the Program has maintained a research portfolio that addresses all Strategic Subgoals. Figure 1 in

Appendix D shows the distribution of projects in the TI Program Portfolio for FY2013[1] by Strategic Subgoal, subset by intramural/extramural status. The largest number of projects address Subgoal 5, high-risk and vulnerable worker groups, which reflects prioritization of this goal to foster integration of the TI Research Program with sector programs, many of which meet the definition of high-risk worker groups.

Impacts Made (Process- or Outcome-Related) since Last Review

The revised TI Research Program Strategic Goals were finalized in Spring 2014, and are more concise and focused, with fewer goals overall. The revised goals will guide intramural and extramural research from 2014 through 2019. The goals are well-defined, based on rigorous surveillance data, and focused on contemporary research needs. Comments on the proposed goals from external researchers, grantees, other federal agencies, and stakeholders help ensure that TI Program research reflects the state-of-the science, is complementary to work done by others, and meets the needs of stakeholders.

Following are updates on outcome-related impacts from examples presented in the 2012 progress report, which highlighted efforts to prioritize motor vehicle safety research, and selected examples from other Strategic Subgoals to demonstrate the breadth of impacts from the Traumatic Injury Research portfolio.

- Subgoal 1 (Falls): The free smartphone application for ladder safety[8C] was downloaded more than 22,600 times between June 2013 and June 30, 2014. This smartphone app was integrated into the NIOSH/OSHA/CPWR (Center for Construction Research and Training; also referred to as the National Construction Center in the 2012 report, Recommendation 6) national campaign to prevent falls in construction,[9] and both OSHA and CPWR helped promote the app. The app was a top 6 finalist (from more than 60 nominations) and received an Honorable Mention in the Health and Human Services (HHS) Innovates competition. It is responsive to the emerging widespread use of smartphones and the potential for this technology to be used to advance worker safety.
- Subgoal 2 (Motor Vehicle Safety): The International Organization for Standardization (IS0) standard 39001:2012, *Road Traffic Safety (RTS) Management Systems – Requirements with Guidance for Use*, was published in the fall of 2012.[8D] TI Program staff serve on the US committee, which continues to promote application of the standard.
- Subgoal 2 (Motor Vehicle Safety): The ANSI/ASSE Z15.1-2012 standard, *Safe Practices for Motor Vehicle Operations*, was revised in 2012 with considerable input from the TI Program. We worked with ASSE to publicize the standard, including making a presentation at the annual conference and co-authoring an article in an ASSE publication that was sent to more than 35,000 members.[8E, 8F] TI Program staff continue to collaborate with external partners to inform employers and other stakeholders about the value of the standard as a framework for a comprehensive road safety management program.
- Subgoal 3 (Violence Prevention): More than 5,600 healthcare workers completed the NIOSH on-line violence course between August 2013 and June 30, 2014, obtaining continuing education credit. This course, developed in partnership with extramural researchers and federal partners, built upon previous research illustrating that nurses were infrequently trained on their risk for workplace violence and prevention measures.[8G]

[1] FY2013 represents a typical year in the reporting interval. Part of FY2012 was reported in the last progress report and FY2014 is not yet complete.

- Subgoal 4 (Machine and Industrial Vehicle Safety): In 2013, intramural researchers received the NIOSH Bullard-Sherwood Research-to-Practice Award, recognizing research impact, for their efforts to develop and publicize a website with NIOSH-designed Cost-effective Rollover Protective Structure (CROPS) designs. These designs can be utilized by manufacturers or by individual farmers to outfit older tractors with life-saving Rollover Protective Structures (ROPS) that are less expensive than those available from manufacturers and dealers.[8H] The CROPS designs and website complement efforts by NIOSH-supported Agricultural Centers to increase the use of ROPS on tractors. The CROPS website received more than 3,700 visits in 2013, and nearly 3,000 visits between January and June 2014.
- Subgoal 2 and 5 (Motor Vehicle Safety and High-Risk and Vulnerable Work Groups): Award-winning science[8I] that included the collection of contemporary anthropometric data on fire fighters, and development of methods to analyze the data for design applications, are influencing the design of fire apparatus.[8J, 8K] The NFPA Committee for fire apparatus[8L] is currently considering revisions to seat-belt and seat specifications that will better accommodate today's larger fire fighters while wearing their gear. It is anticipated that these new designs will increase the use of seat belts by fire fighters and reduce motor-vehicle related deaths, the leading cause of fire fighter injury death.
- Subgoal 6 (Surveillance): The TI Program increased the availability of agricultural injury data on the NIOSH web by creating new webpages with tabular data from several agricultural injury surveillance programs.[8M] These agricultural injury webpages received more than 3,500 visits between January 2013 and June 30, 2014. The agriculture injury data are collected in conjunction with the USDA, and are used by groups including the NIOSH-supported National Children's Center for Rural and Agricultural Health and Safety (NCCRAHS), to guide prevention programs and support grant applications.

In addition to the specific impacts identified above, the number of visits to TI Program webpages demonstrates widespread use of TI research by stakeholders. There were more than 750,000 visits to TI Program webpages in 2013, and nearly 430,000 visits from January through June 2014. Included among the most visited webpages were those dedicated to: Violence (Subgoal 3: among the most popular TI webpages, with more than 47,000 hits between January 2013 and June 30, 2014); Falls (Subgoal 1); Agricultural Injury, Construction injury, Fire Fighters (Subgoal 5: High-Risk and Vulnerable Worker Groups); and the Fatality Assessment and Control Evaluation (FACE) program that addresses multiple Subgoals, including Machinery and Industrial Vehicles and Surveillance (Subgoals 4 and 6: with more than 91,000 visits to FACE webpages between January 2013 and June 30, 2014).

Future Plans

The TI Program will continue to evolve the Program's goals. We will revise goals at five-year intervals, per the BSC's recommendation, with the next review scheduled to begin in 2018 and to cover the period 2020 to 2025. Performance Measures that were incorporated into the revised goals will be used to assess progress. We will also continue to prioritize goals annually to ensure forward momentum and greatest potential for impact.

The TI Program is developing a five-year Strategic Action Plan that will complement the Program's Strategic Goals. The Plan will be an internal working management tool to identify infrastructure, priority partnerships, annual goals, and communication priorities. The TI Steering Committee will be charged with developing this plan in late 2014. The plan will utilize a Strengths, Weaknesses, Opportunities, and Threats (SWOT) methodology, be based on existing

and short-term anticipated resources, and be reviewed and revised annually by the TI Steering Committee.

Recommendation 2

Develop an explicit plan for each Subgoal. The TI Research Program should develop an explicit, written plan within each Subgoal for progression along the public health framework, including the circumstances under which work in the Subgoal would cease. Additional considerations should be the relevant balance between risk factor and intervention research.

Background

Status

In progress

External Factors

None

Implementation of Recommendation

Activity: Development of an Explicit Plan for Each of the Traumatic Injury Subgoals

Description

There are currently six TI Subgoals: 1) fall prevention, 2) motor vehicle safety, 3) violence prevention, 4) machine and industrial vehicle safety, 5) high-risk and vulnerable worker groups, and 6) surveillance. Each Subgoal includes Intermediate Goals (research results being used by stakeholders to improve worker safety) and Activity/Output Goals (specific project-type goals). Intermediate and Activity/Output Goals are based on stage of knowledge and research, and focus on phases of the public health framework needed to accomplish each goal. For goals where little research and progress towards prevention has been made (e.g. reducing injuries among vulnerable worker groups such as workers with physical disabilities), the focus is on surveillance and risk characterization and goals are included on intervention evaluation research to follow through the public health framework. For goals where a mature body of research exists, where the risks are known and promising prevention strategies have been developed (e.g. reducing workplace violence among high risk retail workers), the focus is on the later stages of the public health framework, such as intervention evaluation and transferring research to practice. For goals where risks and effective prevention strategies are known, but injuries persist (e.g. construction falls), there is a focus on continued research addressing design and human factors issues, and marketing and disseminating information to promote adoption of promising and/or proven prevention strategies.

Progress

When the TI Strategic Plan was revised in 2009, Activity/Output Goals based on the status of research and following the public health framework were added. Workgroups that are currently proposing revisions to the Strategic Plan received guidance to consider: the progression of research in the past few years, the relative balance between risk factor and intervention research (recognizing that many injuries can be prevented without a complex analysis of

causation), and Performance Measures to foster assessment of when goals have been achieved and should be retired. It is anticipated that the 2013 revision to the Strategic Plan will retire some Activity/Output Goals and add other Activity/Output Goals to advance research along the public health framework.

Impact

The inclusion of Intermediate and Activity/Output Goals in the TI Strategic Plan provides an explicit plan that fosters progression of TI research along the public health framework. Periodic revisions to the plan provide a mechanism for refreshing goals, including retiring those that are no longer needed.

Future Plans

The draft revision to the TI Strategic Plan will be widely distributed to researchers and stakeholders this fall, and input sought through a public docket. Seeking researcher and stakeholder input will help ensure that the plan is consistent with the current state of knowledge.

2014 Update

Addition of or Modifications to Activities since Last Review

In May 2014, the NIOSH Center for Motor Vehicle Safety published its five-year Strategic Plan, which set the Center's direction, established its scope, and presented its strategic goals for multidisciplinary research and communication.[8N] The plan was developed by a diverse internal team of subject matter experts, then strengthened and modified in response to review by external experts and posting for public comment. The plan's development was directed by the Haddon Matrix, where the driver, the vehicle, and the environment were all considered to be points for potential intervention, and policies and programs relevant to work-related motor vehicle safety were identified as another possible intervention point. The existing research portfolio was mapped to this framework. The Center's five strategic goals to reduce work-related crashes and resulting injuries are: identifying risk factors; evaluating engineering and technology-based interventions; evaluating administrative, management, and programmatic interventions; technical assistance and research to improve work-related motor vehicle safety globally; and effective communication of prevention information to stakeholders. The plan is consistent with and complements TI Subgoal 2 to reduce work-related motor vehicle incidents and crashes, but is more detailed and includes annual goals and tactics.

Progress Made or Maintenance Efforts since Last Review

As part of the ongoing, iterative development of an explicit plan for each TI Subgoal, the 2014 TI Strategic Goals revision reflects progress since the goals were last revised in 2009, and up-to-date knowledge regarding research needs and priorities. Preliminary revisions were based on feedback from assessments by the Subgoal workgroups indicating that some goals had been achieved or were no longer priorities, others needed to be revised, and new goals were needed to address contemporary and emerging issues. TI Research Program leadership reviewed proposed revisions and worked with the six workgroups to emphasize intervention research over risk factor research when justified by the state of the science. Changes to the goals were validated by input from researchers and stakeholders via the public docket.

A considerable number of goals were retired, including one Subgoal (1b, Falls Research in Health Services), an associated Intermediate Goal, and 64 Activity/Output Goals across all six Subgoals. One new sub-Goal (3d) was added to evaluate violence prevention measures addressing socio-demographic risk factors, along with an associated Intermediate Goal. Across all six Subgoals, ten Activity/Output Goals were added to further advance research-to-practice.

New to this update of the Strategic Goals, Performance Measures were included for each Activity/Output Goal that indicate concrete progress toward achieving that goal. These 106 measures include markers of when work should cease and/or decision points for future research. Inclusion of specific timeframes was made on a case-by-case basis, and included considerations of: ongoing work that was anticipated to be completed at a given point in time; stages at which decisions on future directions should be made; and mechanisms to prioritize and encourage more timely attention.

Collaboration continued to be an important element and is, in fact, one of the four Mission Statements in the TI Strategic Goals document.[8B] Among all goals, more than half include such language as "collaborate with," "work with," "partner with," and "coordinate with," reflecting the Program's emphasis on collaboration with stakeholders, other federal agencies, and research partners. Moving data into the hands of stakeholders is also a continuing essential thread in the fabric of the Goals. Goals and Performance Measures frequently mention "provide," "translate," and "transfer."

Impacts Made (Process- or Outcome-Related) since Last Review

To increase capacity for evaluating engineering and technology-based interventions to prevent motor vehicle injuries, we have outfitted the Division of Safety Research Virtual Reality "cave" with driving scenarios and have procured a driving simulator. This investment will position intramural researchers to advance engineering control research goals on occupational motor vehicle safety (Subgoal 2) and the new Center for Motor Vehicle Safety Strategic Plan.[8N]

The current structure of the Traumatic Injury Strategic Goals provides an explicit plan for each Subgoal, with Intermediate Goals that identify how the research will be used by others (that is, external to NIOSH) to advance worker safety, Activity/Output Goals that reflect work across the public health framework with emphases on intervention evaluation, collaboration and knowledge transfer, and Performance Measures that encourage decisions as to when goals should be retired or how future research should be directed. The TI Program goals follow the format used by all NIOSH Programs. This format aligns with the logic model used in the NA review of the TI Program demonstrating how NIOSH research leads to improvements in worker safety.

Future Plans

As part of the periodic revision of the TI goals, Performance Measures will also be reviewed and revised. The next revision/update is scheduled to begin in 2018.

The five-year Strategic Action Plan for NIOSH activities that is being developed to complement the TI Strategic Plan will include planning at the Strategic Subgoal level, as well as at the Intermediate and Activity/ Output Goal level. The Plan will be an internal working management tool to identify infrastructure, priority partnerships, annual goals, and communication priorities, and will be reviewed and revised annually by the TI Steering Committee.

Recommendation 3

Work with other federal agencies that support injury prevention and control research. NIOSH and its TI Research Program should work with senior leadership from other federal agencies to outline areas of collaboration and synergy; to identify opportunities to further the science of injury control and prevention and to reduce the burden of injury across populations, environments and products.

Background

Status

In progress

External Factors

There are incentives for some federal agencies to be enthusiastic about working with NIOSH and the TI Research Program. Agencies with a regulatory focus or programmatic responsibilities for worker safety, such as OSHA and DOT, can benefit from the scientific expertise that the Program can provide. However, federal agencies' level funding and travel restrictions may decrease opportunities for collaboration and require agencies to find creative approaches for working together.

Implementation of Recommendation

Activity A: Routine Communication with Key Federal Agencies with Mutual Interests and Responding to Rulemaking and Technical Assistance Requests

Description

The TI Research Program participates in regular meetings, organized and led by the NIOSH Office of the Director, that discuss areas of mutual interest and potential collaborations with key federal agencies. This includes monthly teleconference calls with OSHA, and quarterly meetings between NIOSH, OSHA, the Mine Safety and Health Administration (MSHA), and the Environmental Protection Agency (EPA). Examples of traumatic injury topics discussed at these meetings include construction falls and the lethal use of methylene-chloride based products in bathtub refinishing which was identified by a NIOSH-supported surveillance program and OSHA.

The TI Research Program conducts routine communication with key federal agencies with specific interests in traumatic injury to: 1) identify synergies and potential collaborations, and 2) communicate Program findings with potential programmatic application by other agencies. This includes: leadership of a federal interagency task force on preventing workplace violence that meets annually; leadership of a federal interagency working group on preventing childhood agricultural injuries that meets twice annually; participation on the Centers for Disease Control and Prevention (CDC) leadership team addressing the Motor Vehicle Winnable Battle that meets every other month; twice-yearly meetings with the National Center for Injury Prevention and Control (NCIPC); approximately annual meetings with the Bureau of Labor Statistics (BLS); and participation in quarterly OSHA Compliance Assistance calls that include OSHA staff from national, regional and state offices. Additionally, Program staff are in regular communication with the Department of Labor's Wage and Hour Division (WHD) around issues of child labor, the US Coast Guard (USCG) on fishing vessel safety, and the National Institute for Sleep Disorders Research on issues of fatigue and safety.

Finally, the Program develops formal NIOSH comments on rulemaking that address worker safety and responds to requests for technical assistance from other federal agencies.

Progress

There are numerous examples of the TI Research Program's routine communication with key agencies leading to productive collaborative relationships, and fostering the use of Program findings in worker safety efforts. The following are a few key examples:

- NIOSH, OSHA and others are collaborating on a multi-year National Campaign to Prevent Falls in Construction[9] launched this past spring. This campaign informed by TI Research Program science is pooling resources and taking advantage of each collaborator's networks and partnerships to send consistent authoritative messaging on preventing falls in construction.
- NIOSH and several federal agencies, including the Department of Justice, are finalizing a document that will provide guidance for preventing workplace violence in federal agencies.
- In 2011, NIOSH and OSHA co-branded a guide on preventing nail gun injuries[10] which pooled resources and expertise to provide and widely disseminate authoritative guidance on preventing this common construction injury. The NCIPC has featured this publication on their website[11] which has resulted in the document's safety message being widely available to nailgun users beyond workers, such as consumers who use nail guns in their homes.
- Program participation on the CDC Motor Vehicle Winnable Battle team has resulted in the addition of a goal specific to worker safety which complements pre-existing goals such as increasing seat belt use. The CDC webpage associated with this effort[12] includes links to the NIOSH webpage on motor vehicle safety resulting in worker safety being acknowledged and addressed as a component of CDC's efforts to prevent motor vehicle injuries.
- Program products, including products from the Fatality Assessment and Control Evaluation (FACE) project, have been included in OSHA-developed resources for compliance officers.

The Program regularly responds to federal agency requests for technical assistance and comments on proposed rulemaking. As examples, the Program participated by invitation in the 2010 National Transportation Safety Board (NTSB) sponsored Fishing Vessel Safety Forum, and is providing technical assistance to the National Marines Fishery Service as they develop rulemaking.[13] As noted earlier in this document, the Program is contributing to an HHE, in response to requests from USDA and OSHA, to assess the impacts of increased poultry processing line speeds on worker safety. In 2011, the Program also provided technical assistance to the WHD who requested guidance on whether 16- and 17-year-olds could safely use patient lifting devices. Since 2009, the Program has contributed to NIOSH formal comments on rulemaking with worker safety implications, including: Federal Motor Carrier Safety Administration (FMCSA) rulemaking on hours of service of truck drivers, OSHA's 2011 proposed rule on recordkeeping, WHD's 2011 proposed rulemaking on agricultural child labor laws, and the Department of Labor's (DOL) 2010 proposed rulemaking to implement the YouthBuild Program.

Impact

The TI Research Program's routine communication with key federal agencies has identified areas of collaboration and synergy, leveraged resources, and contributed to expanded communication of findings and products. The Program's engagement with the CDC Motor Vehicle Winnable Battle and NCIPC has contributed to worker safety issues being recognized in

broader injury prevention efforts. Joint campaigns and products with other federal agencies have resulted in extensive coverage in the lay and business press and contributed to increased dissemination and awareness of these products.

The Program's routine communication with other federal agencies has also resulted in Program findings informing those agencies' prevention efforts. As examples, based on Program recommendations, the WHD is now allowing youth to participate on patient lifting teams *when* the youth have received appropriate training and *when* supervised by a trained adult. The USCG is collecting information recommended by the Program in their investigations of vessel losses to guide their prevention efforts, and they are focusing regulatory efforts on high-risk fishing fleets identified by the Program. And, Program findings influenced NTSB recommendations for improving commercial fishing safety that include requiring vessel owner and skipper training in stability and mandatory use of flotation devices for workers while on deck.[13]

Finally, NIOSH comments on proposed regulations have contributed to regulations that better protect workers. Examples include 2012 changes to the YouthBuild Program which includes safety training and oversight,[14] and extensive improvements to child labor law regulations in 2010[15] that were largely based on earlier Program comments and data.

Future Plans

The TI Research Program will continue regular communications with key agencies. There are several joint efforts that are pending, including a co-branded OSHA/NIOSH Alert on the hazards of using methylene chloride-based products in bathtub refinishing, and the posting of several under-development Program products on the NCIPC website (e.g. a phone app on ladder safety, a motor vehicle safety youth fact sheet, and an on-line violence prevention course for nurses on the NCIPC website targeted to healthcare professionals).

The Program will continue to respond to proposed rulemaking and requests for technical assistance, but will also be more proactive in obtaining advance notice of agencies' regulatory agendas and research needs. One mechanism for doing this is to seek input from regulatory agencies when updating and revising the TI Strategic Plan.

The Program will also seek out additional agencies with which to develop relationships, strengthen existing relationships, and establish regular communications. Examples include agencies within DOT and the National Institutes of Health (e.g. National Institute on Aging and National Institute for Child Health and Human Development). Enhanced relationships with additional federal agencies have the potential to leverage resources, lead to collaborative research and increased funding for worker safety research, and expand worker injury prevention efforts.

2014 Update

Addition of or Modifications to Activities since Last Review

The TI Program did not reach out to the National Institutes of Health, focusing instead on strengthening and building relationships with agencies within the Department of Transportation (DOT). This will be revisited in the future.

Progress Made or Maintenance Efforts since Last Review

All regular meetings with key federal agency partners continue. Meetings with OSHA, NCIPC, and the CDC Motor Vehicle Winnable Battle Team are now held quarterly. Meetings with the US

Coast Guard (USCG), the interagency task force on preventing workplace violence, and the interagency workgroup on preventing childhood agricultural injuries also continue. TI Program management and senior staff represent the Program in these meetings, identifying additional staff who should participate as needed. Selection of staff to represent the Program continues to be made on the basis of pre-existing relationships founded in common research interests, subject matter expertise, and training needs (i.e., junior staff are brought in to encourage staff development and enable continuity). No one staff member is overburdened with partnership responsibilities, which would adversely affect timely completion of research.

In communications with OSHA, WHD, NHTSA, FMCSA, and NHTSA, the TI Program Manager regularly inquired about research needs for future rulemaking that the TI Program might address. When the TI Strategic Goals were revised, the draft proposal was provided to numerous federal agencies with a request for feedback, including agencies with regulatory roles (OSHA and DOT agencies). DOL/BLS and NCIPC provided comments.

The Program continued to respond to proposed rulemaking and requests for technical assistance. The HHE requested by USDA and OSHA to assess the impacts of increased poultry processing line speeds on worker safety, which was referenced in the 2012 report, was finalized.[15A] In 2013, the Program contributed to NIOSH comments on the Department of the Interior/Bureau of Safety and Environmental Enforcement (BSEE) draft policy statement about safety culture for performing or overseeing oil and gas operations on the Outer Continental Shelf.[15B] The TI Program is currently contributing to NIOSH's comments on the proposed EPA rule for revisions to the agricultural worker protection standard.

Following are selected examples of Program-level work with key federal agency partners since the last progress review.

DOL:

- Workplace violence and falls research were discussed at monthly NIOSH-OSHA Liaison and Information Exchange (NOLIE) meetings. We have also participated in follow-up meetings with OSHA and various stakeholders on workplace violence which, among other things, is expected to contribute to revisions to OSHA guidelines on preventing violence in healthcare settings.
- We continue to contribute to the construction worker falls prevention campaign, which is a joint venture between OSHA, CPWR and NIOSH in its third year. We have reviewed materials, added the ladder app as a resource, and encouraged state surveillance grantee engagement.[15C]
- NIOSH and OSHA finalized a co-branded document on methylene chloride hazards for bathtub refinishers[15D]; another co-branded document on temporary workers (an increasing and underserved segment of the workforce) is pending.
- We continue to provide guidance on child labor risks to the Wage and Hour Division (WHD), including providing technical assistance for a request regarding safety for bowling alley pinsetters and providing data for use in WHD investigator training.

NCIPC:

- Letters signed by both the NIOSH and NCIPC Directors were mailed to Health Commissioners in states with both NIOSH and NCIPC surveillance funding to encourage collaborations. TI Program staff organized roundtables and presentations at meetings attended by these grantees to foster this effort.
- The TI Program and NCIPC collaborated on a national webinar on progress toward Healthy People 2020 objectives on preventing violence[15E]; the BLS and OSHA, by NIOSH invitation,

also participated in the question and answer period. There were more than 300 participants, including at least 12 different state health departments, several state labor departments, healthcare providers and systems, and universities.

US Coast Guard (USCG) and National Marine Fisheries Service (NMFS):

- In March 2014, the USCG and NIOSH signed an Amendment to a Memorandum of Understanding to extend efforts to prevent injuries and fatalities to commercial fishermen and other workers in the marine environment. In support of the Amendment, the two organizations will continue to share information, data and analyses, and will collaborate to develop and test interventions.
- The TI Program is assisting the NMFS in producing a technical guidance document and standards to evaluate hazards of commercial fishing operations across the country. The most recent example of assistance was a presentation/write up in April 2014 explaining the hazards for the freezer trawler fleet in Alaska.[15F]

DOT:

- We made concentrated efforts to reach out to various DOT agencies. Examples include: meetings with key staff in NHTSA, FMCSA, FTA; participation in a May 2014 meeting of DOT and CDC senior leadership to explore potential collaborations on the intersection of transportation and health that included numerous staff from the Federal Highway Administration (FHWA); and a July 2014 NIOSH briefing to the DOT Safety Council that is chaired by the Transportation Deputy Secretary and includes Associate Administrators for different travel modes. These meetings all ended with a commitment for regular communication and continued exploration of mutually beneficial collaborative work.
- The TI Program continued its collaboration with FMCSA on the National Survey of US Long-Haul Truck Driver (LHTD) Health and Injury, which was conducted by NIOSH with partial funding from FMCSA. The results, with the first of several planned papers recently published in the American Journal of Industrial Medicine,[15G] are expected to contribute to FMCSA's future regulatory and program activities to protect and promote the health and safety of these high-risk transportation workers.

Impacts Made (Process- or Outcome-Related) since Last Review

Relationships were maintained and expanded with key federal agencies with a role in injury prevention and control; specifically, BLS, OSHA, WHD, NCIPC, USCG, NMFS, NHTSA and FMSCA. There are numerous examples of the TI Program's routine communications with key agencies contributing to expanded use of Program findings in worker safety efforts. The following are a few significant examples since the last progress review:

- OSHA helped to publicize the availability of the NIOSH ladder safety smartphone application and other TI Program fall-prevention guidance, including links on the Resources section of the National Safety Stand-Down to Prevent Falls in Construction (June 2-6, 2014) website.[15H] OSHA estimates that more than 1 million workers participated in the Stand-Down.[15I]
- NCIPC helped to publicize the availability of the NIOSH online violence prevention course by disseminating details about the course through their network of stakeholders which includes health professionals.
- NHTSA provided support in communicating findings and recommendations on occupational motor vehicle safety, including a *Morbidity and Mortality Weekly Report* (MMWR) article on older workers[15J] and young worker fact sheets for parents and employers.[15K]

Future Plans

TI Program management and senior staff will continue to meet regularly with federal partners as identified above, prioritizing collaborations with OSHA, NCIPC, USCG, NMFS, and DOT agencies. We will finalize the co-branded documents currently in the planning or development stage, including Guidance for Preventing Violence in the Federal Workplace and NIOSH/OSHA Temporary Worker Guidance. We will continue to respond to rulemaking activities, as well as continue to proactively identify these opportunities through regular communication with regulatory agencies.

The five-year Strategic Action Plan that is being developed will, as part of its annual review and revision process, prioritize interagency partnerships.

Activity B: Routinely Seek Federal Agency Partnerships around Specific Research Areas and Projects

Description

The TI Research Program encourages, and project officers routinely seek, federal agency partnerships around specific research projects of mutual interest. This is done to leverage resources and expand the reach of products and recommendations. To encourage engagement with federal partners, the TI Strategic Plan specifically identifies other government agencies in Intermediate Goals and Activity/Output Goals. Additionally, when the Program management reviews new project concepts and plans, they recommend engagement of appropriate federal agencies when warranted. Project officers and Program management regularly communicate findings to relevant federal agencies.

Progress

Nearly 50% of the current TI Strategic Plan's Intermediate Goals identify federal agencies among the groups that could act upon our research, with many identifying specific agencies such as OSHA. Additionally, nearly 20% of the plan's Activity/Output Goals specify that federal agencies should be engaged.

There are numerous examples of projects that include federal partners and leverage resources. These include projects in which: other agencies provide NIOSH funds or share costs to conduct research activities of mutual interest, NIOSH provides funds to other agencies to take advantage of their infrastructure and minimize costs, and federal agency partners are involved in project design, conduct and dissemination efforts. The following are a few illustrative examples:

- A project to improve the crashworthiness of ambulances receives funding from the Department of Homeland Security (DHS), and the DHS, the National Institute for Standards Technology (NIST), the National Highway Traffic Safety Administration (NHTSA), the US Fire Administration (USFA), and the General Services Administration (GSA) are all involved in the project's design, conduct and dissemination efforts.[16]
- NIOSH provides funds to the USDA National Agriculture Statistics Service to use their farm operator survey infrastructure and established relationships with farm operators to collect data on childhood farm injuries and injuries to agricultural workers. This arrangement is much more cost-effective than if NIOSH was to conduct the surveys independently or contract out the survey design and data collection. USDA posts survey results on their

website which helps extend the reach of these findings since farmers routinely access the USDA Website.[17]

- The Fire Fighter Fatality Investigation and Prevention Program works in close collaboration with other federal agencies with mutual interests in fire fighter safety, including NIST. In response to fatality investigations suggesting that Self Contained Breathing Apparatus' (SCBA) facepieces were thermally degrading in extreme fire environments while fire fighters were trying to escape, NIST conducted laboratory and field research which confirmed the findings. NIST has contributed to communication of these findings to fire service stakeholders.[18]

In Fiscal Year 2012, 36% of TI Research Program intramural projects identified federal partners. In addition to agencies identified above, these federal agency research partners included: OSHA and the OSHA Construction Directorate; WHD; Employment and Training Administration; FMCSA; Federal Highway Administration; Bureau of Transportation Statistics; Federal Aviation Administration; NTSB; USCG; National Weather Service; US Forest Service; Consumer Product Safety Commission (CPSC); Veteran's Health Administration; Agency for Healthcare Research and Quality; Center for Medicare and Medicaid Services; and the Department of State.

Impact

Collaborations with other federal agencies result in new resources to conduct work at reduced costs that might not otherwise be conducted, foster the use of Program results by other government agencies, and extend the reach of Program recommendations. Examples of intermediate outcomes from these efforts are numerous and include:

- Subgoal 2 (Motor Vehicle Safety): A nearly final National Fire Protection Association (NFPA) Standard for the manufacture of ambulances, which is the first such standard, will greatly improve the safety of workers in the ambulance patient compartment. This proposed new standard was largely influenced by NIOSH work with numerous federal partners including DHS, NHTSA, NIST and USFA.[19]
- Subgoal 5 (High-Risk and Vulnerable Worker Groups): A nearly final revision to an NFPA standard that will improve the thermal performance of SCBA facepieces, providing lifesaving improvements to SCBAs.[18]

Future Plans

When reviewing the draft TI Strategic Plan revision proposed by the Subgoal workgroups, the TI Research Program management and steering committee will consider if federal agencies are appropriately identified in the Intermediate Goals (targets for use of our research) and Activity/Output Goals (partners in research and outreach). In reviews of new project concepts, Program management will continue to review proposed engagement with federal partners and encourage engagement with other promising federal partners when warranted.

Program management and project officers will continue to seek research partnerships with other government agencies on worker safety issues of mutual interest. As one example, the National Institute of Justice is currently considering, for funding in Fiscal Year 2013, two program proposals that would provide empirical data to guide efforts to prevent motor vehicle crash injuries among law enforcement personnel.

Addition of or Modifications to Activities since Last Review

Based on concerns raised by extramural grantees regarding data on occupational violence from the National Crime Victimization Survey (NCVS), the TI Research Program reached out to the Bureau of Justice Statistics (BJS) to reconcile apparent discrepancies in trends between the NCVS and other data sources. These discussions led to a jointly issued federal register notice requesting recommendations for the best ways to identify occupational violence in the NCVS and for proposed improvements and enhancements to the survey. Six sets of comments were received.[19A] We are currently working with BJS to consider this input in an ongoing redesign of the NCVS, and plan to develop a co-branded document to address methodological issues and trends in workplace violence.

Progress Made or Maintenance Efforts since Last Review

In FY2013, the DHS partnership on ambulance safety standards was expanded to include the collection of anthropometric data on emergency medical services. Also in 2013, NIOSH entered into interagency agreements with the National Institute of Justice (NIJ) to conduct motor-vehicle safety research for law enforcement officers, an area of mutual interest. NIJ is providing funding to: 1) pilot FACE investigations of fatal motor vehicle-related deaths of law enforcement officers; and 2) support an evaluation of a comprehensive motor vehicle safety program implemented in a municipal police department.

The TI Program has several long-term data-sharing relationships with other federal agencies, some of which have lasted decades. We continue to receive the Census of Fatal Occupational Injuries (CFOI) research file from BLS, and to collect data in partnership with the Consumer Product Safety Commission (National Electronic Injury Surveillance System-Work Supplement [NEISS-Work]), DOL/Employment and Training Administration, and USDA (National Agricultural Statistics Service [NASS]). The TI Program strictly adheres to other agencies' data confidentiality requirements, and ensures compliance by requiring and providing annual training to all employees with approved access. This training is in addition to the training required by other agencies. These collaborative relationships make efficient use of resources, providing NIOSH with reliable data and the other agencies the means for wider dissemination and analysis of their data.

The 2014 TI Strategic Goals continue to identify key federal agencies in Intermediate and Activity/Output Goals. TI project officers continue to seek out project-level partnerships with key federal agencies. When reviewing new TI research proposals, TI Program management consider if federal agencies should be included in the research conceptualization, execution, and results dissemination. In FY2013, 55% of TI Program intramural projects with external partners identified federal partners.

Impacts Made (Process- or Outcome-Related) since Last Review

TI Research Program collaborations with other federal agencies at the project level continue to leverage resources and increase the reach and impact of research findings. These collaborations allow the TI Program to have access to data from other agencies at no cost, afford the Program the ability to conduct research at a lower cost than if NIOSH undertook the research *de novo*, and provide funding for NIOSH research of mutual interest to other agencies. Project-level collaborations also contribute to increased reach and impact of project findings

when other agencies help with communicating and acting upon project findings. The following are select examples of impact from project-level partnerships with other federal agencies, including updates on partnerships highlighted in the previous progress review:

- Subgoal 2 (Motor Vehicle Safety): In partnership with DHS, NHTSA, and NIST, new standards on ambulance safety have been achieved and others are pending. NFPA has a new standard for ambulance manufacture. Two Society of Automotive Engineer standards have been finalized and several more are in development. Additionally, manufacturers have developed and successfully tested more crashworthy seats, patient cots, and multi-point restraint systems that can be installed on bench seats; these products are now available on the market. Market share is expected to increase once the standards are finalized. The project officer for this effort is a 2014 finalist for the prestigious and highly competitive Samuel J. Heyman Service to America Medals that showcase impactful and innovative work of federal employees.[19B] Medalists will be announced in September 2014.
- Subgoal 5 (High-Risk and Vulnerable Worker Groups): Collaborative work between NIOSH and NIST, in which NIOSH identified that self-contained breathing apparatus (SCBA) facepieces could melt in extreme fire conditions and NIST conducted follow-up research confirming this phenomenon, resulted in a new NFPA standard that subjects SCBA to more rigorous heat resistance testing. Safer SCBA that are more resistant to extreme fire conditions are now available as a result.[19C] Using similar evidence from current and past NIOSH fire fighter fatality investigations, NIOSH is now working with the Alcohol Tobacco and Firearms Fire Research Laboratory to assess potential heat-related failures of fire hoses.
- Subgoal 5 (High-Risk and Vulnerable Worker Groups): After several mid-air collisions occurred in Alaska airspace, NIOSH partnered with the Federal Aviation Administration (FAA) to solve pilot communication problems: 1) frequencies were changed so pilots at airports west of the Susitna River now communicate on the same frequency; 2) the FAA removed a page from the flight guide that provided inconsistent information; and 3) in May 2014, the group developed zones with separate frequencies so pilots can communicate with each other in a specific area.[19D]

Future Plans

The TI Research Program will continue to ensure that Program goals appropriately identify federal agencies as partners in research and as end-users of our research in effecting change. New projects will continue to be reviewed to ensure that potential federal partners are identified and engaged. Program management and project officers will continue to seek research partnerships with other government agencies on worker safety issues of mutual interest.

Work with BJS on improvements/enhancements to the NCVS will be completed. With BJS, we will develop a co-branded document to address methodological issues and trends in workplace violence.

We will work with the Alcohol Tobacco and Firearms Fire Research Laboratory to assess potential heat-related failures of fire hoses.

Recommendation 6

Ensure collaboration among NIOSH-funded researchers. NIOSH should review its practices and take steps to improve the opportunities for intramural and extramural, including state occupational public health programs, to communicate and collaborate without excessively

directing extramural research to the detriment of scientific creativity. NIOSH should also further ensure collaboration and coordination among its programs, including the traumatic injury, construction, mining, and agriculture programs.

Background

Status

In progress

External Factors

Current governmental limitations on travel and conference spending have the potential to decrease opportunities for intramural and extramural researchers to meet in person and develop and foster partnerships. Despite these barriers, NIOSH continues to find constructive ways to leverage existing resources to address priority occupational safety and health issues.

Implementation of Recommendation

Activity A: Increase Coordination between TI Research Program Management and the Office of Extramural Research Programs and Encourage Collaborations between Intramural and Extramural Researchers

Description

Linkages between the NIOSH Office of Extramural Programs (OEP) and intramural research programs have been strengthened, with the express purpose of fostering complementary intramural and extramural research programs and supporting mutually beneficial collaborations between intramural and extramural researchers. The OEP now routinely provides NIOSH program managers, including the TI Research Program, with summaries of awarded grants in their program areas, and an OEP staff person serves on the TI Research Program Steering Committee. This provides opportunities to identify complementary activities between the intramural and extramural research programs, and to pursue mutually beneficial collaborations. Additionally, OEP has a process and mechanism to include NIOSH staff for up to 5% of their time as unpaid consultants on extramural grant proposals.

The TI Research Program also commits staff time and funding to foster and support intramural and extramural collaborations in cooperative agreement programs, including the National Construction Center, Agricultural Safety and Health Centers, National Children's Center for Agricultural and Rural Health and Safety (Children's Center), and State-based Occupational Health and Safety Surveillance grants (a.k.a. state occupational public health programs). In all cases, there are close working relationships and regular communications between NIOSH program managers, staff and grantees, and in some cases specific projects to support coordination and collaboration.

Progress

The TI Research Program has a greater awareness of NIOSH extramural TI grants than in the past. Increased staff time and funding has been committed to provide technical support to and foster collaborations with state occupational public health programs, and to aid in the broad dissemination of grantee products. A prime example of this is the NIOSH website[20] which was established to serve as a clearinghouse for state products.

There is broad engagement of extramural researchers in NIOSH intramural projects. In Fiscal Year 2012, more than 44% of TI Research Program intramural projects identified extramural research partners. These include collaborations with state occupational public health programs, Agricultural Safety and Health Centers, the Children's Center, the National Construction Center, and university researchers. The scope of these collaborations ranges from research conception and implementation to dissemination of findings and products.

The following are a few illustrative examples of Program intramural/extramural collaborations and products:

- The National Construction Center is one of the key collaborators in the National Campaign to Prevent Falls in Construction described previously. Additionally, state occupational public health programs are expanding the outreach of the campaign by developing related materials and referencing the campaign.[21]
- Program staff provided support and made substantial contributions to the Children's Center update of a national action plan that will provide guidance on future steps by the private and public sectors to reduce childhood agricultural injuries.[22]
- Program intramural staff have co-authored several articles with state occupational public health programs.[23-26]

Impact

The TI Program is better positioned to identify potential collaborations with extramural research partners. Collaborative work with the extramural community increases coordination and leverages resources. As one example, the collaboration between TI Research Program intramural staff and the Michigan FACE program on the use of methylene chloride-based products in bathtub refinishing led to involvement of OSHA, the identification of a larger problem not limited to Michigan,[27] and co-authoring of an MMWR article[23] that received substantial press coverage.

Coordinated and complementary work between intramural and extramural researchers improves worker safety. As one example, the Program believes that documented reductions in childhood agricultural injury rates since 1998 (> 60%) can be attributed in part to the collaborative and complementary work of intramural researchers, extramural researchers, and the Children's Center that conducts extensive outreach to stakeholders.[28]

Future Plans

The OEP will continue routine communication regarding funded extramural TI grants to TI Research Program management. The Program will consider this extramural research in revising the TI Strategic Plan, reviewing new project concepts, and in encouraging intramural and extramural collaborations. The Program will continue committing staff time and resources to facilitate coordination and collaboration with cooperative agreement grantees.

Program management will seek to build relationships and collaborations with NIOSH supported Education and Research Centers (ERCs) to leverage resources and work to increase the visibility of occupational injury research.

Addition of or Modifications to Activities since Last Review

NIOSH has developed a new webpage, the NIOSH Data and Statistics Gateway, that provides centralized access to NIOSH data and tools.[28A] This webpage includes links to TI surveillance data, tools for research (such as the NIOSH Industry and Occupation Computerized Coding System), and research resources (including TI fatality investigations). Additional TI Program surveillance and research data will be added to this site in the future.

Not addressed in the last progress report was the TI Program's use of data sharing agreements to foster collaborative work with extramural researchers and increased use of TI Program data and research. As one recent example, the Division of Safety Research has signed a data use agreement with leading workplace violence researchers at the Universities of Iowa and North Carolina to further analyze, report, and disseminate data collected from an intramural study that evaluated store compliance to municipal ordinances aimed at reducing convenience store robberies.

Progress Made or Maintenance Efforts since Last Review

NIOSH has continued rigorous efforts to integrate the intramural and extramural research programs. This effort is led by OEP and progress reports are provided and discussed at quarterly NIOSH management meetings attended by program managers. OEP continues to provide program managers with information on extramural grants in their program areas. New since the last review is an extensive effort to develop a roadmap for research integration that includes extensive input from NIOSH researchers. An internal report with concrete action items is projected for fall of 2014, and will include next steps in similarly getting input from the extramural research community.

For the first time, both intramural and extramural research was considered in the proposed revisions to the Strategic Goals. Extramural researchers were encouraged to comment on the revised goals; notices were sent to extramural attendees to the 2011 NOIRS, ERC directors, and state surveillance grantees requesting feedback. TI goals were prioritized for extramural research.

The TI Program continued to commit staff time and funding to foster intramural and extramural collaborations in cooperative agreement programs. Several NIOSH intramural projects are for the express purpose of supporting these collaborations, and there are coordinating committees, such as for FACE and surveillance, that provide a structure for routine communication and meetings. TI Program researchers continue to serve as Scientific Advisors for Agricultural Centers and consult on specific projects. ERCs were routinely included in TI outreach activities, including seeking comments on the revisions to the TI Strategic Goals and the National Crime Victimization Survey.

The following are selective examples of coordinated and collaborative work on cooperative agreements:

- The CPWR, with input from intramural scientists, created digital stories from FACE cases to illustrate construction safety, and provided related handouts and Toolbox Talks.[28B] The media firm that collaborated with CPWR won a 2014 silver Telly Award (the highest honor for these prestigious visual arts awards) for the series in the category Internet/Online Programs, Segments, or Promotional Pieces - Safety.[28C]

- The TI intramural and extramural programs continue to contribute to the National Falls Prevention Campaign.[15C] A NIOSH-authored article in the *Morbidity and Mortality Weekly Report (MMWR)* on ladder safety was timed to coincide with the launch of the third year of the campaign.[28D] Several state-based occupational health and safety surveillance grants developed complementary products and promotional efforts. For example, the Massachusetts FACE Project created a ladder safety fact sheet for painters[28E] and was instrumental in campaign posters being displayed in municipal buses. The Connecticut program had a billboard about the National Safety Stand-down that was part of the campaign, and numerous state programs distributed information about the campaign through their networks.
- NIOSH intramural researchers regularly provide the Children's Center with data that they use in health communication materials and to guide their work.[28F] Additionally, with concurrence from the Center, NIOSH convened an external scientific review panel to re-review tractor operation guidelines which had originally been released as part of the North American Guidelines for Children's Agricultural Tasks (NAGCAT). The panel reviewed pertinent research and recommended an increase to the minimum age for tractor operation. In 2014, the TI Program then worked with the Children's Center to have that guideline changed in the NAGCAT.[28G]
- TI researchers actively participated in a May 2014 workshop organized by the National Tractor Safety Partnership whose Steering Committee includes directors of the New York Center for Agricultural Medicine and Health, the Children's Center, and other NIOSH grantees. The purpose of the workshop was to develop an action plan to advance tractor safety.

Additionally, there are numerous examples of other collaborations between intramural and extramural researchers that are not associated with cooperative agreements. These collaborations are less structured than those with cooperative agreements, and arise from relationships established through networking (such as through the National Occupational Injury Research Symposium [NOIRS], see Activity B [p. 28]) and mutual research interests. The following are examples since the last review:

- When the TI Program began to develop the online violence prevention course for healthcare workers, we learned of a Small Business Innovation Research grantee who had recently received funding to perform similar work. We reached out to that grantee and combined resources. The course was developed and publicized in coordination with numerous external researchers, including academia, professional associations, unions, and hospitals.[8G]
- NIOSH published the proceedings from an extramurally funded series of symposia on young workers, increasing the reach of the white papers developed for these symposia.[28H]

In FY2013, 52% of TI Research Program intramural projects identified extramural research partners.

Impacts Made (Process- or Outcome-Related) since Last Review

Widespread outreach to extramural researchers seeking comments on the proposed revisions to the TI Strategic Goals likely raised awareness about the TI Program and associated goals. The new NIOSH Data and Statistics Gateway webpage, and the anticipated future release of summary information on all NIOSH intramural projects by program, is expected to further increase extramural researcher knowledge about intramural work and better position them to reach out to NIOSH for collaborative work. A pending OEP effort to seek input from the

extramural community is expected to identify additional steps that NIOSH can take to encourage complementary and collaborative work between intramural and extramural researchers.

Collaborative work with the extramural community increases coordination, leverages resources and improves worker safety. As one example, the online violence prevention course for healthcare professionals has been very well received, with more than 5,600 healthcare professionals having completed the free course through June 30, 2013 and obtained continuing education credit. Ninety-five percent of these individuals agreed that they could apply knowledge gained from this course in their work. Extramural partners were critical in both designing and distributing information on the course. When the course was released in August 2013, it was the most visited page on the NIOSH website, and it continues to be among the most viewed NIOSH websites. Another example of successful extramural collaboration is the FACE program, and FACE webpages continue to be popular.

Future Plans

The TI Program will continue to work to raise mutual awareness of TI research among intramural and extramural researchers, and take steps to encourage collegial and mutually beneficial collaborations. This includes adding TI research data and tools to the Data and Statistics Gateway webpage, and continuing the work to increase the availability of information on TI research on the NIOSH website. OEP will continue to explore steps to encourage better integration of the NIOSH intramural and extramural programs, including seeking input from the extramural research community. The TI Program will continue to commit staff time and resources to facilitate coordination and collaboration with cooperative agreement grantees.

TI Program management will seek to expand relationships and collaborations with NIOSH-supported ERCs to leverage resources and work to increase the visibility of occupational injury research. This includes providing presentations and webinars on TI research goals and research to ERCs, and exploring the potential for student practicums at NIOSH and the use of NIOSH TI data in student research projects.

The TI Program Strategic Action Plan is currently under development. Although directed at NIOSH activity, it will prioritize intramural/extramural collaborations. Work with state surveillance partners funded by cooperative agreements will be given precedence.

Activity B: Periodically Sponsor Meetings that Provide Opportunities for Intramural and Extramural Researchers to Communicate

Description

The TI Research Program sponsors the National Occupational Injury Research Symposium (NOIRS) on an approximate 3-year cycle (typical grant cycle) and has sponsored topic-specific meetings on occasion. These meetings bring intramural and extramural researchers together to present their latest research studies, methods and findings, and to network and identify potential collaborations.

Progress

The 5th NOIRS, co-sponsored by the National Safety Council and Liberty Mutual Research Institute for Safety, was held in Morgantown, WV in October 2011.[29] Informal feedback collected at the 2008 NOIRS was used in planning the 2011 meeting. The symposium was attended by more than 200 national and international scientists, with approximately 90

intramural staff from nine DLOs and more than 120 extramural attendees. The symposium featured more than 150 oral presentations and 41 posters, with at least 23 presentations or posters authored jointly by NIOSH and extramural partners, including academic and government researchers. Topics and sessions focused on TI Research Program Subgoals (e.g. preventing falls and motor vehicle-related injuries), industry sectors (e.g. Aagriculture, Forestry and Ffishing; Construction; Healthcare; and Mining), and other NIOSH cross-sector programs (e.g. Work Organization, Musculoskeletal Disorders)**.**

The Program also sponsored a fall prevention research conference in Morgantown, WV in May 2010,[30] attended by more than 180 scientists and practitioners from 11 countries. There were 35 intramural attendees and more than 150 extramural attendees. A published proceedings[31] includes 61 articles (3 co-authored by intramural and extramural researchers), and a special issue of the journal *Human Factors* published in June 2012 highlights key research presented at the conference.[32]

Intramural and extramural researchers also had the opportunity to interact at a NIOSH intramural/extramural workshop sponsored by the NIOSH Agriculture, Forestry and Fishing Program in August 2009 in Cincinnati, OH.

Impact

Meetings and symposia such as those described in the progress section above are important venues for creating a community of traumatic injury researchers, and providing intramural and extramural researchers the opportunity to learn more about each other's work, to meet and talk with each other during breaks, and to potentially identify collaborative work. The Program received overwhelmingly positive feedback for the two conferences we sponsored, with many attendees expressing the value and need for such meetings.

The availability of abstracts and proceedings on the NIOSH Website, and publication of key research presented at such meetings in special issues of journals, helps to ensure that the research and findings presented at these meetings reaches a larger audience than just those who attended.

Future Plans

The TI Research Program is working with the National Safety Council to publish a special issue of the *Journal of Safety Research* that will highlight key science presented at the 2011 NOIRS symposium. The special issue is planned for release in late 2012.

The Program is planning to hold NOIRS again in 2014, pending available funds and approval to hold the conference. Informal feedback collected at the 2011 NOIRS would be used in the conference planning, and the Program plans to formally collect feedback at the next NOIRS to help in future planning and to document the impact of such meetings. Attendees would be queried on how the symposium will enhance their work, if attendance led to new professional relationships and partnerships, their suggested periodicity for the symposium, and how the symposium could be improved. The Program would seek co-sponsorship as has been done in the past to leverage resources, and to draw a wider and more diverse set of attendees. Symposium announcements would be sent to current and past TI Research Program extramural grantees. The Program will also explore holding virtual meetings that bring together intramural and extramural researchers using web-based technology. Subgoals (e.g. fall prevention research) could serve as one focus for such virtual meetings.

Addition of or Modifications to Activities since Last Review

No additions or modifications since last review.

Progress Made or Maintenance Efforts since Last Review

In 2013, the *Journal of Safety Research* published a special issue highlighting a series of papers that were presented at NOIRS 2011.[32A]

Planning is underway for the next NOIRS,[29] scheduled for May 19-21, 2015. To leverage resources and attract a wider and more diverse group of attendees, the meeting will be co-sponsored by NSC, ASSE, Liberty Mutual Research Institute for Safety, and the Society for Advancement of Violence and Injury Research (SAVIR, a new co-sponsor). Co-sponsors will sponsor awards, including awards for students and/or early career scientists. The Scientific Program Committee has been formed, with membership from the TI Program Steering Committee, other relevant sectors and cross-sectors, and the co-sponsors, and the agenda is under development. The symposium save-the-date announcements have been sent to past NOIRS attendees and current and former TI Program extramural grantees. To solicit interest beyond these groups, we are requesting that other agencies (e.g. NCIPC) forward the announcement to their employees and stakeholders. NSC will lead the post-meeting evaluation of NOIRS 2015.

Impacts Made (Process- or Outcome-Related) since Last Review

The *Journal of Safety Research* Special Issue arising from the NOIRS 2011 was published in February 2013.[32A] The issue was guest-edited by the TI Program Steering Committee Coordinator (who was also the 2011 Scientific Program Committee Chair) and included a forward written by the TI Program Steering Committee Manager and Coordinator. It featured 15 papers from the conference that were collectively cited 37 times between February 2013 and July 2014.

Planning is underway for NOIRS 2015. Feedback from NOIRS 2011 was integrated into planning, both formally and through the inclusion of planning committee members from NOIRS 2011. Co-sponsorship was broadened to include SAVIR, with their interest in advancing the science of injury research and connections to injury researchers not focused on occupational injury. The conference theme will be future-oriented, emphasizing partnership and integration. Plenary speakers with national and/or international reputations will be solicited, from academia, industry and labor, to provide a broad thematic backdrop to the conference.

In 2013, a high-profile virtual meeting (webinar) hosted by HHS for Healthy People 2020 provided an opportunity to present TI Program research and impact. The webinar included presentations by NCIPC, NIOSH, and a NIOSH grantee who described efforts in New York State to prevent violence against public workers. There were more than 300 participants, including infrequent audiences for NIOSH, such as healthcare providers and systems.[32B]

Future Plans

The next NOIRS is scheduled to take place in May 2015. Planning for the scientific agenda is currently underway, using informal feedback collected at the last NOIRS and input from Scientific Program Committee members. NSC will lead the post-meeting evaluation effort, with

the assistance of TI Steering Committee members, to help in future planning and to document the impact of such meetings. Attendees will be queried on how the symposium will enhance their work (research, teaching, and/or practice), if attendance led to new professional relationships and potential partnerships, their suggested periodicity for the symposium, and how the symposium could be improved. The TI Program will work with NSC to publish a special issue of the *Journal of Safety Research* highlighting key presentations from NOIRS 2015. The other co-sponsors are currently considering their roles, with awards for students and/or early career scientists as possibilities.

The Program is planning a series of virtual meetings using web-based technology (webinars) for FY2015 that will bring together intramural and extramural researchers, highlighting complementary work and providing a forum for discussion to increase impact and identify future directions. Program Subgoals (e.g. fall prevention research or workplace violence) will serve as foci for the first of these virtual meetings. Webinars are an efficient use of resources in an era of limited travel and budgets, and save time that would otherwise be spent on travel. They do not take the place of in-person meetings like NOIRS, but are complementary.

Activity C: Integrate and Coordinate the NIOSH TI Research Program with other NIOSH Programs

Description

To facilitate the integration and coordination of the TI Research Program with other NIOSH programs, TI Research Program staff are members of National Occupational Research Agenda (NORA) sector councils (e.g. Construction; Agriculture, Forestry and Fishing; Healthcare and Social Assistance; Services; and Public Safety) and cross-sector steering committees (e.g. Surveillance; Communications and Information Dissemination; Global Collaborations; and Occupational Health Disparities). In developing and revising the TI Strategic Plan, strategic plans from other NIOSH programs are reviewed to identify mutual interests and to specifically include or encompass goals from other programs. Additionally, NIOSH holds program management (industry sector and cross-sector) meetings at least once yearly to facilitate interaction and identify synergies among the different NIOSH programs.

Progress

The integration of the TI Research Program with other NIOSH programs is illustrated by the overlap in strategic plans, and the extent to which TI Research Program projects address goals in other NIOSH program strategic plans. In the current TI Strategic Plan, 45 percent of the goals (Strategic, Strategic Subgoal, Intermediate, and Activity/Output) mirror or align with 138 goals in sector or cross-sector strategic plans. For example, the TI Strategic Subgoal to reduce falls in the construction industry mirrors the first goal in the NIOSH Construction Strategic Plan, and the two strategic plans include numerous common or consistent goals to:

- develop and foster the use of a scientific base for fall protection designs, technologies, programs and communications; and
- conduct and act upon research to reduce fall risks among Hispanic construction workers.

In Fiscal Year 2012, all TI projects addressed at least one goal from an industry sector or another cross-sector program. For example, 35% of current TI projects also address goals in the Construction Sector Strategic Plan, 35% address goals in the Agriculture, Forestry and Fishing Strategic Plan, and 27% address goals in the Services Sector Strategic Plan. The recent re-review of the NIOSH Agriculture, Forestry and Fishing Program included numerous TI projects, and TI

Program staff gave presentations to the review panel on agricultural injury surveillance, childhood agricultural injury prevention, and tractor safety research. Most NIOSH cross-sector programs are being addressed in current TI projects. For example, 21% of TI projects address goals in the Surveillance Strategic Plan, 15% address goals in the Communications and Information Dissemination Strategic Plan, and 15% address goals in the Occupational Health Disparities Strategic Plan.

Impact

Coordinating and integrating with other NIOSH programs leverages resources and improves worker safety. For example, the integration of the TI Research Program with the NIOSH Construction Program has enhanced the National Campaign to Prevent Falls in Construction, by contributing products and increasing dissemination of information on the campaign.[9] The integration of the TI Research Program with the Agriculture, Forestry and Fishing Program likely contributed to the positive scores received by the Program upon a review of its progress since its initial National Academies review.[33]

Future Plans

The TI Research Program will continue to coordinate and seek integration with other NIOSH programs. TI Program staff will continue to participate on NORA sector councils and cross-sector steering committees, and industry and cross-sector strategic plans will be reviewed in TI Strategic Plan revisions. As an example of future integration efforts, the TI Research Program will work with the Agriculture, Forestry and Fishing Program in implementing recommendations from the recent re-review of that program.[33] Also, pending TI Research Program products will be featured as part of the National Campaign to Prevent Falls in Construction. These include a phone app on ladder safety and a planned MMWR surveillance article on falls in construction co-authored by TI intramural staff and state occupational health programs.

2014 Update

Addition of or Modifications to Activities since Last Review

DSR is the focal point for traumatic injury research at NIOSH. Managers and coordinators from all NORA sectors and cross-sector programs are invited to participate in the yearly DSR project reviews. This interaction offers the opportunity for program managers to provide input on project progress and dissemination plans.

TI Program staff who are involved in construction-related research meet quarterly with NORA Construction Program leadership to identify opportunities for coordination and collaboration. Additionally, the TI Program coordinates quarterly phone conferences with the Construction Sector Manager and representatives from most FACE states in which dissemination of fall-related FACE investigations is discussed.

Progress Made or Maintenance Efforts since Last Review

The TI Program has actively participated in NIOSH Program Portfolio meetings to foster increased coordination and collaboration among NIOSH sector and cross-sector programs. TI Program staff continue to participate on sector councils, including: Agriculture, Forestry and Fishing; Construction; Healthcare and Social Assistance; Wholesale and Retail Trade; Services; and Transportation, Warehousing and Utilities. TI Program staff were involved in considering

program adjustments based on the 2012 re-review of the Agriculture, Forestry and Fishing Program. Program staff are also members of steering committees for other cross-sector programs, including: Occupational Health Disparities, Surveillance, Total Worker Health™, and Work Organization and Stress-Related Disorders; and NIOSH Centers, including: Workers' Compensation, Climate Change, and Direct Reading and Sensor Technologies. There are numerous examples of integration between the TI Program and other NIOSH programs, including:

- Several TI Program staff have presented relevant research at sector council meetings.
- The TI, Construction and PtD Programs jointly developed and disseminated a recently issued Workplace Solutions on incorporating fall protection into building designs or renovations.[33A]
- TI Program staff collaborated with members of the Occupational Health Disparities Cross-Sector to publish two articles for a MMWR special issue on Health Disparities (the first to include work-related injuries),[33B] and a larger article for a special issue of the *American Journal of Industrial Medicine* on Achieving Health Equity in the Workplace.[33C]
- The TI and Total Worker Health™ programs collaborated on a podcast about young worker safety, which was broadcast by the Safety Breakthrough radio network and is available on the NIOSH and Safety Breakthrough websites.[33D]
- The Center for Motor Vehicle Safety collaborates with the Oil and Gas Extraction Sector and the Global Collaborations Cross-Sector, both of which have specific interests in motor vehicle safety. The Center and the Oil and Gas Extraction Sector have developed joint products and research.[33E, 33F] The Center worked with the Global Collaborations Cross-Sector to develop a strategic goal and supporting goals that would promote collaborations among global partners to develop strategies for reducing occupational road traffic injuries worldwide. (The TI Program shares this goal.) The Center and the Global Collaborations Cross-Sector work closely to exchange information on global activities and respond to internal and external requests for technical assistance and reports of progress.

As part of the recent updating of TI goals, the Program specifically investigated the goals of sectors and other cross-sectors for complementary purpose and coordination. For example, a new TI goal on workplace violence incorporated an Occupational Health Disparities goal to ensure research and impact on this important topic continues to be represented.

Impacts Made (Process- or Outcome-Related) since Last Review

The revised TI Research Goals continue to have shared goals with intersecting NIOSH programs. Collaboration and coordination with other NIOSH programs leverages resources and increases impacts on worker safety, and the TI Program continues to attend to such integration. Figure 2 (Appendix D) illustrates our success, showing Traumatic Injury projects that also address strategic goals in sector programs and a selection of cross-sector programs.

Program participation on sector councils has directly led to new TI research funded by outside entities. The two new NIJ-funded projects described in the 2014 Update for Recommendation 3 (Activity B, Progress section [p. 20]) arose from TI Program staff participation on, and connections made through, the Public Safety Sector Council. TI Program participation on the Construction Sector Council directly led to a new TI Project, funded by a consortium of construction and insurance companies, that is exploring the potential to increase the protection of construction helmets during falls.

TI Program integration with other programs has also led to increased awareness about worker safety and the use of TI findings and recommendations. We have previously referenced

the productive integration of the TI Program with the Construction Sector-led Falls Prevention Campaign and the extensive reach of the campaign, with an estimated 1 million workers touched by the 2014 Safety Stand-Down alone.[15H] Examples of impacts from integrated work between the Center for Motor Vehicle safety and the Oil and Gas Extraction Sector follow:

- A peer-reviewed journal article on motor vehicle fatalities in the oil and gas industry, authored by the Center for Motor Vehicle Safety Coordinator and NIOSH Oil and Gas Extraction Program leaders, has been widely cited by other researchers and the media because local areas are experiencing adverse impacts of vehicle traffic related to oil and gas extraction, particularly hydraulic fracturing.[33E]
- The NIOSH Center for Motor Vehicle Safety worked with the Motor Vehicle Safety subcommittee of the Oil and Gas Extraction Sector Council to develop guidance on the use of in-vehicle monitoring systems to identify potentially unsafe driving practices and to promote safer driving through focused coaching by supervisors. This guidance was distributed widely through industry channels, and has also been adopted by the International Association of Oil and Gas Producers as a supplement to its Land Transportation Safety Recommended Practice (OGP 365). OGP 365 is recognized internationally by the industry as its consensus guidance for motor vehicle safety programs.[33F]

Future Plans

The TI Program will continue to coordinate and seek integration with other NIOSH programs. Staff will continue to participate on NORA sector councils and cross-sector steering committees, and industry sector and cross-sector strategic plans will be reviewed in future TI Strategic Plan revisions.

Recommendation 9

Research prevention strategies for traumatic injuries in a changing workplace. The TI Research Program should consider research on the safety impact of changes in the nature of work as well as intervention research targeting organization policies and practices, including prevention through design approaches.

Background

Status

In progress

External Factors

While there are a variety of useful data sources for tracking changes in the nature of work, such as shifts in employment by industry sector and changes in worker demographics, some changes are more difficult to detect and track, such as changes in work organization.

Implementation of Recommendation

Activity A: Conduct Surveillance and Research to Identify Emerging Issues and Track Changes in the Nature of Work

Description

The TI Research Program conducts surveillance and research that identifies emerging issues and tracks some facets of changes in the nature of work. Intramural and extramural researchers, principally state occupational public health programs, routinely analyze population-based databases and report on trends in worker demographics, industries, occupations, hazards, injuries and deaths. The Program includes case-based surveillance that provides richer data than that available from population-based databases. Case-based surveillance has been shown to be valuable in identifying emerging safety issues that would otherwise be masked in less detailed population-based surveillance. The TI Program's case-based surveillance includes the Fire Fighter Fatality Investigation and Prevention Program and intramural and extramural FACE projects.

The Program has also collected and analyzed contemporary anthropometric data on different worker populations. This research has demonstrated dramatic differences in current working populations from the decades-old anthropometric data that is typically used in the design of personal protective equipment, clothing, and work vehicles.[34]

Progress

Intramural and extramural researchers have published analyses and products that address trends in employment,[35,36] farm hazards,[37] injured worker demographics and employment, and injuries.[20,24,25,36] In 2009, the Program added and modified targets for fatality investigations in the FACE projects based on surveillance data demonstrating sizable numbers of deaths among foreign-born workers and growth in the energy industry. The pre-existing fatality investigation target of Hispanic workers was modified to focus on foreign-born workers and deaths in energy production was added as an investigation target. Additionally, several state-based FACE programs have additional investigation targets for fatalities on an upward trend, including deaths associated with renewable energy and older worker deaths.[38]

Both the FACE and the fire fighter fatality investigation projects have recently identified emerging worker safety issues. The identification by the Michigan FACE program of the emerging issue of methylene chloride-based products being used in bathtub refinishing has been described in earlier sections of this report. Another emerging issue identified by FACE is the use of highly flammable floor finishing products. The Massachusetts FACE program investigated the deaths of 3 Vietnamese workers in 2 separate incidents in a 10-month period.[39] An emerging issue identified by the Fire Fighter Fatality Investigation and Prevention Program has also previously been described. The problem with the thermal performance of SCBA facepieces has been attributed to increases in the intensity of fires associated with modern building construction and furnishings.[18]

The Program has recently collected anthropometric data on truck drivers[7] and fire fighters[34] which demonstrates that these worker populations are larger than in the past. These data have been shared with manufacturers so that they can be used to improve the fit and safety performance of trucks and fire fighter personal protective equipment.

Impact

TI Research Program findings and products have contributed to increased awareness about emerging issues and efforts to improve worker safety. For example, findings and recommendations from an article on older worker injuries[25] co-authored by TI intramural and extramural researchers and BLS were cited in an article in the September/October 2011 issue of the AARP magazine, with a circulation exceeding 47 million readers. The article co-authored by intramural and extramural researchers, with OSHA, on the lethal use of methylene chloride in bathtub refinishing[23] was covered by several news outlets with large distributions, including: the Washington Post, Fox News, ABC News, CBS, Time, USA Today and US News and World Report. The TI Research Program and OSHA also communicated this hazard and prevention recommendations through their networks.[27]

TI Research Program data and findings on emerging issues have and are being used by others to improve safety. Spurred by the Massachusetts FACE program investigations of 3 fatally injured Vietnamese floor finishers, a statewide task force mobilized to prevent future deaths and injuries. Among numerous state-wide prevention efforts, in July 2010, Massachusetts banned the sale and commercial use of highly flammable lacquer sealers.[39] Revisions to the NFPA SCBA standard that will improve the thermal performance of SCBA facepieces is pending.[18] And as noted previously, manufacturers of truck cabs,[7] fire apparatus, and fire fighter protective equipment and clothing are currently using Program anthropometric data to develop vehicles, personal protective equipment, and clothing that better fit today's workers.

Future Plans

The TI Research Program will continue to use population-based and case-based surveillance data to identify trends and emerging issues, publish these findings in the scientific press, and communicate them to stakeholders, including other government agencies, standards bodies, manufacturers, employers and workers. The Program will periodically refresh fatality investigation targets for the FACE program, considering surveillance data trends. The Program will also work with the NIOSH Work Organization and Stress-Related Disorders Cross-Sector Program to explore data sources that can provide trend data on work organization issues, e.g. the Quality of Worklife Module. And, the Program will continue to advance the design of work vehicles, equipment, personal protective equipment and clothing through the collection and analysis of contemporary anthropometric data, and the sharing of these data with manufacturers and standards bodies.

2014 Update

Addition of or Modifications to Activities since Last Review

A number of new initiatives for emerging issues are described below:

Underserved populations: In December 2013, NIOSH launched a Worker Safety and Health Initiative for American Indians and Alaska Natives. Data from the BLS CFOI were utilized to provide a profile of demographic, industry sector, and other factors relevant to this underserved population.[39A]

New vehicle technologies: The NIOSH Center for Motor Vehicle Safety is considering the potential impact of semi-autonomous vehicles and other connected-vehicle technologies on

work-related motor vehicle safety. In April 2014, a NIOSH Science Blog posting discussed the policy implications of semi-autonomous vehicles for managers of fleets.[39B]

A project funded for FY 2013-2016 is utilizing the existing capabilities of the Virtual Reality (VR) laboratory in the Division of Safety Research to assess the effectiveness of Advanced Driver Assistance Systems to alert fire apparatus drivers of high-risk road segments. A project funded for FY2015 will enable evaluation of driver decision-making at signalized intersections. This research is expanding NIOSH's capacity to use VR technology to develop simulations of driving and road environments, which can be adapted in the future to address other research scenarios.

Driver behavior: Research in the TI Program is taking advantage of new sources of data to conduct research on work-related driving. One analysis is using data from actigraphs and driver logs collected by the Virginia Tech Transportation Institute to examine truck drivers' daily/weekly sleeping patterns, on/off-duty activities, and medication/caffeine use, and to evaluate the potential impacts of these on safety-critical events (i.e., crashes, near-misses, and high-risk driving behaviors). Another analysis is leveraging naturalistic data collected by the University of Michigan Transportation Research Institute to assess lane-change behavior of truck drivers.

Safety culture/climate: NIOSH established a workgroup to advance research on Safety Culture/Climate, working to clarify the critical linkages between the assessment of safety climate and the comprehensive management of safety in safety management systems. Several TI Program staff are active participants.

Climate change: In January 2014, NIOSH formed a Climate Change Workgroup to investigate the occupational safety and health implications of climate change and develop an action plan to ensure that NIOSH is proactively addressing these issues; the workgroup is co-chaired by a TI Program investigator.

Progress Made or Maintenance Efforts since Last Review

Following are a selection of recent research efforts related to emerging issues completed by TI Program staff:

Underserved populations: Data from TI Program farm operator surveys, collected in conjunction with USDA, were examined for injuries to American Indians and Alaska Natives living and working on farms in the US.[39C]

In January 2014, data collected in the Minority Farm Operator Childhood Agricultural Injury Survey were used to produce a NIOSH numbered document on youth, injuries and safety for farms operated by racial minorities.[39D]

Health disparities: The articles that were referenced in the 2014 Update for Recommendation 6 (Activity C, Progress Made [p. 30]) that were co-authored with Occupational Health Disparities Program staff illustrated a strong linkage between demographics, such as gender and race, and high risk jobs.[33B, 33C]

Older workers: An analysis of CFOI data by TI Program staff found that workers aged 65 years or older had more than three times the rate of motor-vehicle crash fatalities, compared with workers aged 18 to 54 years.[15J]

Older workers experience a higher injury rate from ladder-associated falls. In commemoration of Workers' Memorial Day and the National Falls campaign, a very recent analysis of three national surveillance data sets documented that ladder-associated fall injuries increased with age. The resulting article, authored by TI Program staff, was published in the MMWR,[28D] featured in a NIOSH Science blog,[39E] and has an accompanying YouTube video.[39F]

Multiple job holders: Kentucky surveillance grantees wrote an article examining fatalities among persons who hold multiple jobs.[39G]

Temporary workers: OSHA and NIOSH are co-branding a document with recommendations for temporary workers, entitled "OSHA-NIOSH Fact Sheet: Recommended Practices for Protecting Temporary Workers" (publication pending). The Fact Sheet includes recommendations from FACE investigations, and will include links to products from state FACE programs.

Data sources for evidence of the changing workplace: The Occupational Health Supplement to the National Health Interview Survey provides data on the changing workplace, including variables on long and irregular working hours, shift work, and temporary work. Data are available on the NIOSH website and in published articles, and there is a public use dataset available. Additionally, work is underway on a 2015 supplement that will allow assessments over time and collect additional information.[39H]

Electronic health records: With the increasing movement toward electronic health records, efforts have been expended at both the Program and Institute level and headway has been made toward the inclusion of work-relatedness, industry, and occupation in these records. The TI Program has worked closely with the NIOSH Surveillance Program, including participation in a workgroup on electronic health records, and documents and supporting research have been developed or are in progress. Among the latter are a NIOSH-funded contract with the University of Utah to show feasibility of collecting these data in electronic health records, two intramural projects designed to assess the utility of this information in the clinical setting, and a new project for FY2015 that focuses on coordination of standard data collection. The availability of such data will provide a rich source of future surveillance data.

Impacts Made (Process- or Outcome-Related) since Last Review

The number of new activities identified above in the "Addition of or Modifications …" section illustrates the ability of the TI Program to recognize and address emerging issues. The following are impacts associated with various emerging issues:

Younger workers: The NHTSA, Network of Employers for Traffic Safety, NSC, and ASSE communicated new findings and recommendations from the Center for Motor Vehicle Safety, including fact sheets for parents and employers about young workers.[15K]

Older workers: The MMWR articles on older worker drivers and ladder falls received extensive press coverage, including: TV (WCBS New York interview), newspaper (USA Today), radio (WABC radio in Atlanta), and online publications (HealthDay, Occupational Health & Safety, Fleetowner).

Fire fighters: Findings and recommendations from the Fire Fighter Fatality Investigation and Prevention Program continue to be routinely communicated in the fire service press, and used in fire department training. Also notable, since the last review the City of Philadelphia amended the Philadelphia Fire Code to address vacant property fire hazards.[39I] This code amendment was in response to recommendations made by the Program in an incident which resulted in the deaths of two fire fighters and serious injuries to two additional fire fighters.

Future Plans

The TI Research Program will continue to use population-based and case-based surveillance data to identify trends and emerging issues, publish these findings in scientific journals, and communicate them to stakeholders, including other government agencies, standard-setting

bodies, manufacturers, employers, and workers. At present, states are re-applying for FACE program funding, and discussions regarding revising fatality investigation targets will be delayed until the next funding cycle and participating states are determined. The TI Program will work with the NIOSH Work Organization and Stress-Related Disorders Cross-Sector Program to explore data sources that can provide trend data on work organization issues (e.g. the Quality of Worklife Module).[39J] This activity had been projected in the 2012 update, but has not yet been undertaken.

TI Program staff are developing a user guide to facilitate the use of anthropometric data by manufacturers to ensure that new truck designs are safer and more ergonomically efficient, to reflect the size differences identified between truck drivers and the general population. Projects utilizing the VR lab, including effectiveness of Advanced Driver Assistance Systems for fire apparatus and evaluation of driver decision-making at signalized intersections, will continue and new ideas to make use of this lab will be developed.

Based on the level of interest from media and safety practitioners in the MMWR report on older drivers,[15J] TI Program staff are preparing an updated version of a 2005 NIOSH Fact Sheet on older drivers in the workplace.

Analysis of data examining truck drivers' sleep, on/off-duty activities, and medication use, and their impact on safety-critical events will be completed. Analysis of naturalistic data to assess lane-change behavior of truck drivers will also be completed.

The Program will be addressing another emerging issue, that of workplace bullying and cyberbullying in educational and healthcare settings.

The TI Program will continue to make our work products accessible to a wide spectrum of consumers. In 2014, NIOSH began using the Clear Communication Index, a tool developed by and for CDC staff to assess the clarity of their public communication materials. The Index is part of the tool kit in CDC's Plain Language Initiative to help implement the government-wide directives of the Plain Writing Act of 2010. In addition, many of our work products are translated into other languages, most frequently Spanish but also other languages. For example, our Slips, Trips and Falls Prevention Guide was adapted by a health and safety organization in Quebec into a French language version, revised with their own national statistics and photographs.[39K]

Activity B: Periodic TI Strategic Plan Revisions and Goal Prioritization to Ensure Research Consistent with a Changing Workplace and the Advancement of Intervention Research on Organizational Policies and Practices, Including Prevention through Design (PtD) Approaches

Description

In periodic revisions to the TI Strategic Plan, consideration is given to whether the plan adequately addresses changes in the nature of work, and if the plan appropriately emphasizes intervention research targeting organizational policies and practices, including Prevention through Design (PtD) approaches. Periodic goal prioritization similarly considers the breadth of TI Program research in these areas, and if the research should be bolstered by goal prioritization.

Progress

The 2009 revision to the TI Strategic Plan included the addition of a Strategic Goal on surveillance which facilitates the collection of data to assess changes in employment patterns

and worker demographics, and the expansion of goals on emerging and understudied high-risk and vulnerable workers, including workers with physical disabilities and day workers. In addition, Activity/Output Goals that were added in the 2009 revision included intervention evaluation, work organization research, and PtD approaches. The TI Strategic Plan is currently being revised by multidisciplinary interdivisional workgroups that have received guidance to consider if goals adequately address the changing workplace and intervention evaluations of organizational programs and priorities, including PtD approaches.

The TI Research Program has prioritized goals between 2010 and the present that include intervention evaluations and PtD approaches. Of the current 3 priority goals for the TI Program, one is centered on a PtD approach to design out fall risk or craft engineering solutions to control worker fall risk, and one calls for intervention evaluations targeted to high-risk worker groups. Current TI research includes several projects that are evaluating organizational policies and practices and several PtD oriented projects. These include:

- Evaluation of interventions to prevent violence against health care workers, including an evaluation of a state regulation that requires specific organizational practices (e.g. written policies and specified training), and an evaluation of a program in psychiatric facilities that also has work organization components (regularly-held group meetings of staff and patients to discuss violence).
- Evaluation of the effectiveness of municipal ordinances in preventing violence against convenience store workers, including how convenience stores made changes in their stores.
- A field-based evaluation of a comprehensive slip, trip and fall intervention in food services, with special attention to the impact of the employer providing slip-resistant shoes.
- The previously discussed collection of anthropometric data on fire fighters and truck drivers which provides critical data for designing safer vehicles and equipment.
- Research to design and test engineering controls to prevent falls, including modifications to ladders to increase stability, and a guardrail device that can easily be installed in a variety of construction environments that present fall hazards.

Impact

Ensuring that the TI Strategic Plan encompasses research on the changing workplace, includes intervention evaluations of organizational policies and practices and includes PtD approaches, is expected to lead to an increase in such research projects intramurally and extramurally. Prioritizing goals is anticipated to lead to additional research in this area.

Previous PtD research and intervention evaluations of work organization policies and practices demonstrates the potential of this line of research. Previous research to develop an engineering control to prevent equipment rollovers is now included on commercial lawnmowers, better protecting workers who use this equipment. Research on patient lifting devices has led to the identification of programs that use these devices in conjunction with comprehensive organizational policies being considered “best practices,” and numerous examples of these programs being adopted by healthcare organizations. The Traumatic Injury Research Program believes that this has contributed in part to reductions over time in back injuries among healthcare workers.[28]

Future Plans

The TI management and steering committee will review the revisions proposed to the TI Strategic Plan by the Subgoal workgroups, and will make changes if warranted to ensure the

plan addresses the changing workplace and includes intervention evaluations of work organization policies and practices. The Program will seek input from extramural researchers and stakeholders to ensure the plan is consistent with current knowledge and that it will meet the needs of stakeholders. The Program will consider future prioritization of goals consistent with this NA recommendation.

Research findings from this line of research will be published in the scientific literature and communicated to stakeholders, including designers, manufacturers, employers and their organizations.

2014 Update

Addition of or Modifications to Activities since Last Review

NIOSH prioritized intramural research evaluating both Climate Change and Safety Management Systems. New projects are anticipated in FY15 and FY16.

Progress Made or Maintenance Efforts since Last Review

In the recent update to the TI Program Strategic Plan,[8B] Strategic Subgoal-specific workgroups considered several inputs and factors, including data and evidence of the changing nature of work, and an emphasis on goals with the greatest potential for impact, such as those that include Prevention through Design (PtD) principles and intervention evaluations. TI management reviewed proposed revisions to ensure that the goals address the changing workplace and include intervention evaluations of work organization and practices. As described in the 2014 Update for Recommendation 1 (p. 6), the TI Program widely disseminated the goals to researchers and stakeholders and received 16 sets of comments.[8A] One entire Strategic Subgoal continues to be devoted to high-risk and vulnerable worker populations. Four Activity/Output Goals and five Intermediate Goals in the revised Plan include specific mention of PtD. Two Sub-Strategic Goals, nine Intermediate Goals, and 23 Activity/Output Goals and/or a related Performance Measure all mention interventions.

Priority intramural goals in 2013 and 2014 emphasized engineering controls and intervention evaluation.

Research involving evaluations tied to work organization highlighted in the previous progress review continue, and new research projects evaluating injury interventions have been initiated. A manufacturer has entered into a licensing agreement to produce and sell a TI Program-developed guardrail device referenced in the 2012 report.

Impacts Made (Process- or Outcome-Related) since Last Review

Revisions to the TI Strategic Plan that encompass research on the changing workplace, including intervention evaluations of organizational policies and practices and PtD approaches, are expected to lead to an increase in such research projects both intramurally and extramurally. Prioritizing goals is anticipated to lead to additional research in this area.

Anthropometric research addresses the changing size of the American worker. These changes are occurring for various reasons, including gender patterns in jobs, aging, and increasing rates of obesity, among others. The TI Program has developed a mobile anthropometric laboratory that increases capacity for collecting data from diverse populations. This research, which supports Prevention through Design, has been extended to emergency medical services workers with funding from DHS, and pilot work is underway for law

enforcement officers. The Human Factors and Ergonomics Society awarded its 2012 Human Factors Prize to a TI researcher for his article on protective equipment sizing and design.[8I] An article was published recently on the use of fire fighter anthropometry to improve fit of fire fighters' apparatus and personal protective equipment.[8K]

Future Plans

In the upcoming selections of priority goals for intramural work, we will consider selecting goals that evaluate work organization and have Prevention through Design potential.

The TI Program's five-year Strategic Action Plan that is currently under development will include special emphasis on the nature of the changing workplace and how best to continue to stay abreast of such changes (e.g. through monitoring of surveillance data and through case reports/sentinel events).

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Appendix A

Comments about recommendations not selected for ongoing review

Recommendation	Comments
#4: Improve surveillance of nonfatal injuries. The TI Research Program should develop a plan for improving surveillance of nonfatal injuries, integral to prevention and to strengthening the TI Research Program portfolio development. A comprehensive approach should go beyond use of employer-based data to include nonemployer-based data sources such as hospital data and other medical data systems, the National Health Interview Survey, and the Behavioral Risk Factor Surveillance System. The TI Research Program should involve other federal and state agencies in developing a cohesive interagency effort.	The TI Research Program is committed to working with federal and state partners to improve surveillance of nonfatal injuries. This is reflected in the addition of a Strategic Goal to the 2009 TI Strategic Plan and associated Intermediate and Activity/Output Goals (discussed under Recommendation #1). The TI Research Program works closely with the NIOSH Surveillance Cross-Sector Program in setting directions for future surveillance and exploring means to fill as many data gaps as possible given limited and decreasing resources. Strategies include utilizing existing data systems such as the National Health Interview Survey, piggybacking on other federal systems to reduce costs, such as NIOSH providing funds to CPSC to collect data on occupational injuries treated in emergency departments (a form of worker reporting), and pursuing the inclusion of work-relatedness variables in the evolving electronic health record. The TI Research Program is currently conducting research on the underreporting of work-related injuries which will provide insights into incentives and barriers to reporting injuries in a variety of systems, including employer-based systems. While the TI Research Program and the NIOSH Surveillance Cross-Sector Program are committed to improving nonfatal injury surveillance, this goal was not chosen for tracking because the approach and data sources are still being defined.

Recommendation	Comments
#5: Work collaboratively with OSHA. An agency of particular importance and relevance to NIOSH is OSHA. The TI Research Program, along with NIOSH leadership, should continue to work with OSHA to identify areas of high priority research that NIOSH should undertake and to identify NIOSH research findings of particular salience for potential regulatory action by OSHA.	This recommendation was not selected for tracking because it overlaps with Recommendation #3 which was chosen for tracking. Specific work to increase collaborations with OSHA and examples of impacts are reported in Recommendation #3, and efforts to identify research of particular salience for OSHA rulemaking are described in Recommendation 1, Future Plans.
#7: Increase the visibility of traumatic injury research. NIOSH should embark on a program to increase the visibility of traumatic injury research in order to attract new researchers. Absent a significant increase in research funding, the TI Research Program can still attempt to influence the number of ERCs that have a focus on safety research and can still disseminate information about the quality, impact and scientific challenges of traumatic injury research, as well as the dynamic changes in the field that go beyond the confines of traditional safety engineering.	The TI Research Program appreciates the need to increase the visibility of traumatic injury research and seeks to do this through several avenues, including: - working with the evolving West Virginia University School of Public Health which is nearby to the NIOSH Division of Safety Research facilities; and - seeking to increase visibility of occupational injury research in the larger injury research field, including through partnership and increased collaborations with NCIPC. This recommendation was not selected for tracking because expectations for progress are tempered by resource constraints and uncertainty regarding the future of the ERCs. The Program plans to conduct outreach to ERCs to build relationships.

Recommendation	Comments
#8: Evaluate research-to-practice efforts. NIOSH should develop a strategic plan for evaluating its r2p efforts and for building the capacity to carry out and evaluate these efforts. Needed disciplines include behavioral sciences; organizational behavior; intervention effectiveness research; public health education; dissemination, implementation, and diffusion research; social marketing; and media advocacy.	The TI Research Program embraces the responsibility for facilitating research-to-practice. The TI Strategic Plan includes r2p Activity/Output Goals for every Strategic Goal, and all projects are evaluated to ensure solid plans are in place to ensure that Program findings and products are relevant to stakeholders who are critical for advancing NIOSH research into practice. As part of NIOSH's program planning system, the TI Program actively documents outputs and associated intermediate outcomes which help in the assessment of efficient and effective transfer methods. This recommendation was not selected for tracking because the expertise needed exceeds the capacity of the TI Program. However, NIOSH as an Institute is moving forward in making an investment in this area using the current expertise available in the NIOSH Communications and Research Translation Office and through the expertise of the extramural community.

Review of Progress Implementation Report for

NIOSH Traumatic Injury Program

Submitted by Board of Scientific Counselors

November 30, 2012

BSC Working Group Members

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Traumatic Injury Score Sheet

Directions: For each recommendation listed below, please circle a score for each scoring element and provide a brief justification for the assignment of that score. The work group may provide scores in .5 increments where they deem appropriate. If the group chooses to do that, please put a .5 next to the corresponding number and circle that number.

Recommendations In Progress:

Recommendation #1
Continue setting goals that are within the TI Research Program's scope and resources.

Relevance: 1 2 3 4 5 **– SCORE: 4**

Brief Justification:

The majority of the focus was on motor vehicles. Little information was presented on other topics. Joint efforts with other agencies, for example, were not really highlighted as part of the strategic plan.

Guiding activities through an iterative strategic planning process is an effective way to respond to the recommendation. It was not clear in the description what process was used to develop and modify the plan (other than that different teams work on different goals). For example, is there a specific process to identify gaps in the program and tie these responses to existing resources? It might be helpful to use methods such as SWOT analyses (which may be used but the process was not described). The criteria listed for goal identification are relevant and appropriate.

Sustainability: 1 2 3 4 5 **– SCORE: 4**

Brief Justification:

The approach described is participatory and ongoing. Based on the recommendation, surveillance data have been integrated as key criteria.

Competing priorities and the potential for incomplete products within the life of the plan is of concern. The reviewers also recognize that other agencies and agency leaders may develop priorities that are not integrated with this plan, and to which the team will need to respond.

Since much of the data needed for the prioritization process is external, ongoing planning that integrates these data will necessitate continued interaction with these agencies. However, changes to these protocols are beyond the scope of this team.

The reviewers noted that three-year review of goals may be too frequent, especially as some of these goals are long-term and the review process is very time- and labor-intensive. We recommend a five year review and update of these goals and this plan.

Progress: 1 2 3 4 5 **– SCORE: 5**

Brief Justification:

The plan has been implemented and maintained with clear goals to continue making progress in the future. Some high-impact achievements were noted, but what these activities were based on or how they were integrated with the strategic plan was not noted. Linking individual projects and activities should be linked to the goals and subgoals of the plan to help with benchmarking and seeing where successes and gaps exist.

Potential Impact: 1 2 3 4 5 **– SCORE: 4**

Brief Justification:

There was no mention of how progress and impact from the strategic plan is evaluated. Although some intermediate outcomes were mentioned, the process for developing and measuring tactics, incremental objectives/strategies, or the use of benchmarks or an underlying logic model was not clarified. How inter- and intra-agency collaborations integrate into the plan should be described, especially with respect to impact and how team work can influence the work of others. Emphasizing outreach to stakeholders and soliciting their feedback is an important component of strategic planning. Although this is part of the plan, new strategies for seeking this input might be warranted.

Recommendation #2
Develop an explicit plan for each subgoal.

Relevance: 1 2 3 4 5 **– SCORE: 4.5**

Brief Justification:

Overall, the TI has adopted an organized and effective approach. There is good integration with sector goals, but not necessarily with the strategic plan. It would be beneficial to see some objectives within the subgoals that focus on collaboration and infrastructure, as the singular focus on stage of research allows the plan to move forward project-by-project rather than in a manner that moves the entire field forward. It would be useful if the research was being turned to practice by more people.

Sustainability: 1 2 3 4 5 **– SCORE: 5**

Brief Justification:

Some of the subgoals are beyond the control of the team – such as industry implementing slip, trip, and fall programs. The team can take substantive steps to encourage this implementation, and perhaps these activities are a more appropriate sub-goal than the actual implementation in individual companies.

Progress: 1 2 3 4 5 **– SCORE: 3.5**

Brief Justification:

The process of evaluating success is not clear. It's recommended that with each written objective or goal have a specific benchmark to determine if the goal has been met, if adequate progress has been made, and if follow-up goals are appropriate. In general, we did not feel this could be assessed yet.

Potential Impact: 1 2 3 4 5 **– SCORE: 4**

Brief Justification: See comments above. The activities described have impact on the larger field, but how this will be measured within the framework of the strategic plan is not clear.

Recommendation #3
Work with other federal agencies that support injury prevention and control research.

Relevance: 1 2 3 4 5 **– SCORE: 5**

Brief Justification:

This is a very important goal and the TI has responded well. Organizing interagency partnerships around rule-making and research is a smart approach and likely to work well. Interagency partnerships are very time-consuming and can take a long time to develop, although the team has some very nice examples of successes. Because data collection is so expensive, these collaborations definitely provide the opportunity to get more out than put in.

Sustainability: 1 2 3 4 5 **– SCORE: 3.5**

Brief Justification:

With the breadth of topics covered by the TI, maintaining partnerships with all of the relevant agencies is resource-intensive. The regular meetings and taskforce approach described is important, as without regular contact communication is likely to be lost. A plan to help identify and organize NIOSH personnel on these activities might be warranted, as the number of partnerships and opportunities for communication are vast.
Increasing limitations on data sharing could be a concern for sustainability.

Progress: 1 2 3 4 5 **– SCORE: 5**

Brief Justification:

Having said, above, that the number of partnerships is daunting, it is still recommended that stronger ties be made with motor vehicle safety agencies, especially since motor vehicle safety is a key priority and focus in the strategic plan. In addition to ongoing partnerships with NCIPC and NHTSA, FHSA is also an important partner because of their activities focused on the built environment and the Coast Guard because of their work with the fishing community.

Potential Impact: 1 2 3 4 5 **– SCORE: 5**

Brief Justification:

NIOSH is uniquely suited to develop these partnerships and is doing a good job leading this effort. These partnerships are likely to be beneficial to NIOSH for sustainability, and also likely to have strong impact on the intramural and extramural research infrastructure. NIOSH is encouraged to document and share these efforts and successes, which will be important to demonstrate the significant value of NIOSH. There are some severe issues on data sharing from other agencies that need to be addressed through the Director's office, since these issues are larger than just the TI program.

Recommendation #6
Ensure collaboration among NIOSH-funded researchers.

Relevance: 1 2 3 4 5 **– SCORE: 4**

Brief Justification:

Activities to foster collaboration are essential to maximize use of resources, but are also time-consuming and must be strategic to be successful. There is no discussion as to how these projects were prioritized other than that they address others' goals. Awareness between extra- and intramural programs is not sufficient, and a plan with clear goals to integrate activities would be helpful. The program does not appear to be actively seeking input from sectors and incorporating them into the plan. Extramural partners do not appear to be informed of intramural activities. NIOSH could encourage warehousing NIOSH-funded

databases, data collection tools, surveys, etc. Conferences such as NOIRS are very helpful in bringing researchers together and should be continued.

Sustainability: 1 2 3 4 5 **– SCORE: 4**

Brief Justification:

It would be helpful to know who is reaching back to the TI program. It is difficult to maintain the level of communication, if it is not being sought from outside partners. It is important to consider which partnerships will yield the highest impact, such as the Safe States Alliance, SAVIR, and ASTHO. It is recommended that the most promising partners and activities be prioritized, so focus will remain on those that will become sustainable. Efforts to work with individual state health offices are likely to be to resource-intensive and spotty to be beneficial in the long-term (other than specific project collaborations). This activity is even more difficult due to travel restrictions.

Progress: 1 2 3 4 5 **– SCORE: 5**

Brief Justification:

Some strong thinking has clearly gone into this step, with some good progress in outreach from the intramural to the extramural program. Some very good examples of NIOSH-led collaborative activities are described, including conferences, special issues of publications, and steps to increase communication.

Potential Impact: 1 2 3 4 5 **– SCORE: 4**

Brief Justification:

It appears the TI program has been successful in doing their part; however, the approach is not well-defined or sufficiently targeted to best leverage available resources. For example, providing information to internal researchers about external research, without specific plans of what the internal reseachers are supposed to do with that information and how it will be evaluated, are not likely to yield systematic or sustainable impacts. It is recommended that the program evaluate the interest of other parties when they prioritize their goals and partners.

Recommendation #9
Research prevention strategies for traumatic injuries in a changing workplace.

Relevance: 1 2 3 4 5 **– SCORE: 5**

Brief Justification:

This is a very broad goal that imposes a new priority on the strategic process for the TI activities. The team has done a good job focusing on this issue and has made some good progress on outcomes. The efforts to integrate work changes into surveillance efforts is impressive. The TI team has also been effective in integrating this topic into the existing priority areas.

Sustainability: 1 2 3 4 5 **– SCORE: 4**

Brief Justification:

This is a topic that will continue to be important in the future. It is difficult to identify emerging issues; it takes time and vigilance and will require significant resources. Workforce

issues will require specific funding. Perhaps more appropriate is integrating this goal as a sub-component of the existing goals identified through the TI strategic planning process rather than maintaining this as a separate goal. A blend of approaches may be best, but regardless the process needs to be well documented through measurable objectives. New technologies, such as autonomous vehicles, are missing from this work.

Progress: 1 2 3 4 5 **– SCORE: 4**

Brief Justification:

Good progress has been made on this goal, including some success stories. The evaluations have been strong.

Potential Impact: 1 2 3 4 5 **– SCORE: 5**

Brief Justification:

This probably has the greatest potential for impact. This is in progress, so it is suspected that this will improve as more research is being conducted, and the results will then be utilized. It is important to define how this topic fits within the strategic plan.

Appendix C

Acronyms – 2014 Update

ANSI – American National Standards Institute
ASSE – American Society of Safety Engineers
BJS – Bureau of Justice Statistics
BLS – Bureau of Labor Statistics
BSC – Board of Scientific Counselors
BSEE – Bureau of Safety and Environmental Enforcement
CDC – Centers for Disease Control and Prevention
CFOI – Census of Fatal Occupational Injuries
CPSC – Consumer Product Safety Commission
CPWR – Center for Construction Research and Training/National Construction Center
CROPS – Cost-Effective Rollover Protective Structure
DHS – Department of Homeland Security
DLO – Divisions, Laboratories and Offices
DOL – Department of Labor
DOT – Department of Transportation
DSR – Division of Safety Research
EPA – Environmental Protection Agency
ERC – Education and Resource Center
FAA – Federal Aviation Administration
FACE Program – Fatality Assessment and Control Evaluation Program
FHWA – Federal Highway Administration
FMCSA – Federal Motor Carrier Safety Administration
FSIS – Food Safety Inspection Service
FTA – Federal Transit Administration
FY – Fiscal Year
GPRA – Government Performance and Results Act
GSA – General Services Administration
HHE – Health Hazard Evaluation
HHS – Department of Health and Human Services
ISO – International Organization for Standardization
LHTD – Long Haul Truck Driver
MMWR – Morbidity and Mortality Weekly Report
MSHA – Mine Safety and Health Administration
NA – National Academies
NAGCAT – North American Guidelines for Children's Agricultural Tasks

NASS – National Agricultural Statistics Service
NCCRAHS – National Children's Center for Rural and Agricultural Health and Safety
NCIPC – National Center for Injury Prevention and Control
NCVS – National Crime Victimization Survey
NEISS-Work – National Electronic Injury Surveillance System – Work Supplement
NFPA – National Fire Protection Agency
NHTSA – National Highway Traffic Safety Administration
NIJ – National Institute of Justice
NIOSH – National Institute for Occupational Safety and Health
NIST – National Institute for Standards Technology
NMFS – National Marine and Fisheries Service
NOIRS – National Occupational Injury Research Symposium
NOLIE – NIOSH-OSHA Liaison and Information Exchange
NORA – National Occupational Research Agenda
NSC – National Safety Council
NTSB – National Transportation Safety Board
OEP – Office of Extramural Programs
OGP – Oil and Gas Producers
OSHA – Occupational Safety and Health Administration
PtD – Prevention through Design
ROPS – Rollover Protective Structure
RTS – Road Traffic Safety
SAVIR – Society for the Advancement of Violence and Injury Research
SCBA – Self-Contained Breathing Apparatus
SWOT – Strengths, Weakness, Opportunities and Threats
TI – Traumatic Injury
UN – United Nations
USCG – US Coast Guard
USDA – US Department of Agriculture
USFA – US Fire Administration
VR – Virtual Reality
WHD – Wage and Hour Division

Appendix D

Figure 1: Traumatic Injury Program: Number of FY2013 Intramural and Extramural Projects by Strategic Subgoals

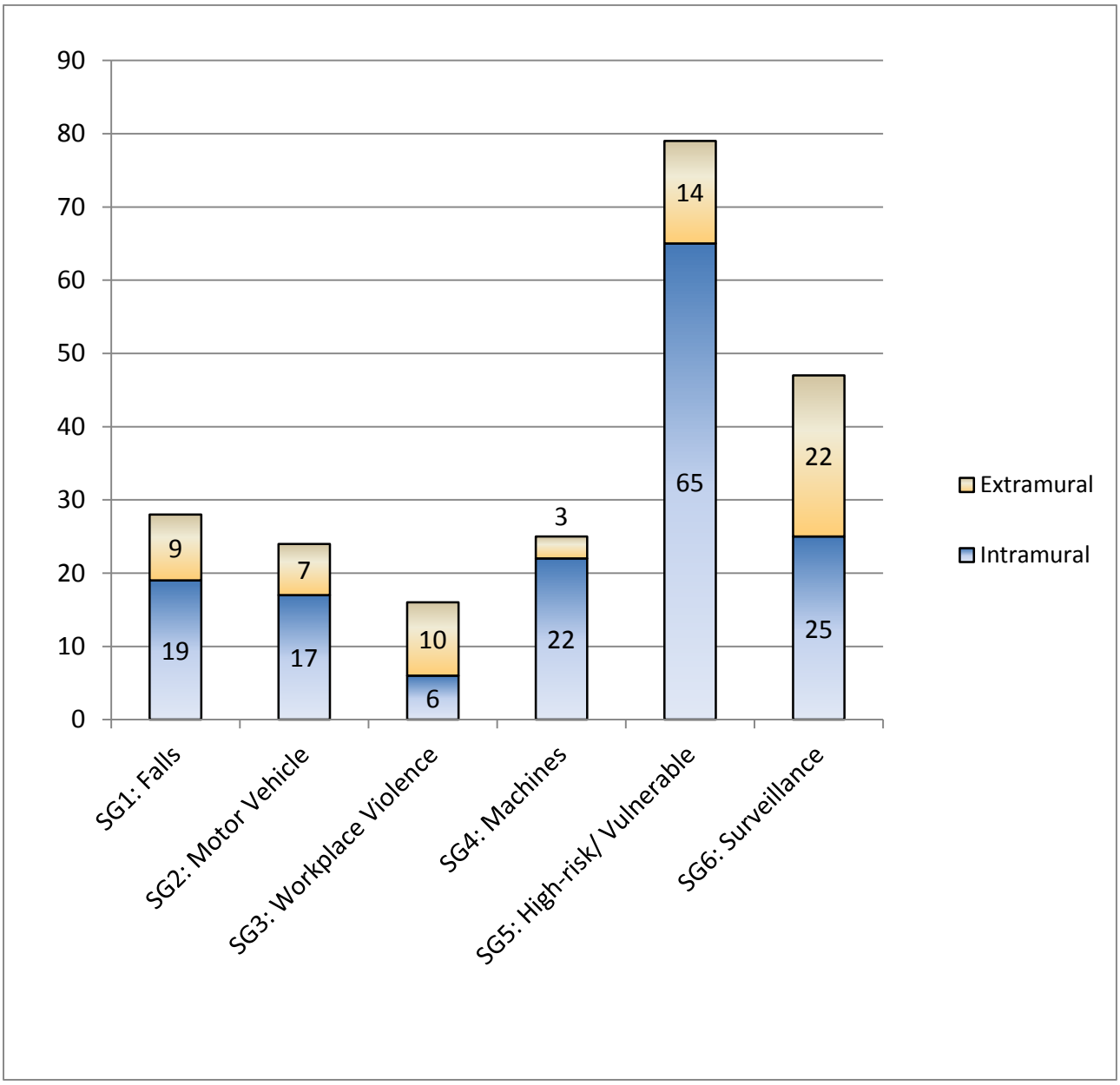

Figure 2: Traumatic Injury Program: FY2013 Projects that met Strategic Goals for NORA Sectors and Selected Cross-Sectors